INDIA RUBBER WORLD

SYNTHETIC

FEBRUARY, 1947

CABOT

LOW HEAT GENERATION

HIGH RESILIENCE

HIGH LOADING

*Semi-reinforcing Furnace Black.

GODFREY L. CABOT, INC., 77 FRANKLIN ST., BOSTON 10, MASS.

THERMOFLEX A

Outstanding Inhibitor of Flex-Cracking

THERMOFLEX A is highly effective for protection against flex-cracking and other types of fatigue deterioration in rubber, GR-S and reclaimed stocks. In addition, Thermoflex A provides good protection against heat deterioration and deterioration from natural aging.

Flexing tests, conducted in the laboratory, prove the effectiveness of Thermoflex A in overcoming flexing failure of natural-rubber compounds. Samples for testing were prepared according to the following recipes:

	Compound No. 400-1914	Compound No. 400-1920
Smoked Sheets	100	100
Zinc Oxide	5	5
Channel Black	50	50
Stearic Acid	3	3
Pine Tar	1.5	1.5
Sulfur	3	3
Zenite B	1.25	1.25
Thermoflex A	1	—

The test specimens were cured for 60 min. @ 274° F, aged in air at 158° F, and then tested on the Du Pont Flexing Machine according to Method C of the Standard Method of Dynamic Testing for Cracking of Rubber Products (ASTM D 430-40). The degree of cracking is expressed in units from 0 to 10. A sample is rated as 10 when it is cracked completely across the grooves. Zero rating indicates no cracking. The results of the test follow:

FLEX RATING

	Flexing Time 64 Hrs.	Flexing Time 136 Hrs.
Compound 400-1914 (1½ Thermoflex A)	0	2.5
Compound 400-1920 (Control)	10	discontinued after 64 hrs.

These results clearly show the effectiveness of Thermoflex A in overcoming flex-cracking. If you have a problem involving flex resistance, specify Thermoflex A. Write for detailed information.

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co., (Inc.), Wilmington 98, Del.

BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY

DU PONT

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SUPERB OIL RESISTANCE

is only one of Hycar synthetic rubber's unusual and valuable properties. Others are listed in the box at the right.

But most important, these properties may be had in an almost limitless number of combinations, each designed to meet specific service conditions of the finished Hycar part.

Our files contain more than 5000 recipes for Hycar compounds—each compound engineered to do a certain job. Parts made from HYCAR have seen service in *every* industry, giving long life, dependability, and economical operation.

That's why we say, ask your supplier for parts made from Hycar Test them in your own application, difficult or routine. You'll learn for yourself that it's wise to use HYCAR for long-time, dependable performance. For more information, please write Department HA-2, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

CHECK THESE SUPERIOR FEATURES OF HYCAR

1. EXTREME OIL RESISTANCE — insuring dimensional stability of parts.
2. HIGH TEMPERATURE RESISTANCE—up to 250° F. dry heat; up to 300° F. hot oil.
3. ABRASION RESISTANCE—50% greater than natural rubber.
4. MINIMUM COLD FLOW—even at elevated temperatures.
5. LOW TEMPERATURE FLEXIBILITY—down to —65° F.
6. LIGHT WEIGHT—15% to 25% lighter than many other synthetic rubbers.
7. AGE RESISTANCE—exceptionally resistant to checking or cracking from oxidation.
8. HARDNESS RANGE—compounds can be varied from extremely soft to bone hard.
9. NON-ADHERENT TO METAL—compounds will not adhere to metals even after prolonged contact under pressure. (Metal adhesions can be readily obtained when desired.)

Hycar
Reg. U. S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

This advertisement appeared in a long list of carefully selected business papers TO HELP YOU SELL parts made from HYCAR.

JUST CAN'T KEEP A GOOD MAN DOWN!

You certainly can't keep Philblack A down, either! Products made with this lively black are famous for their snappy come-backs, their springy resilience! Boy-oh-boy, how they can take it and bob up smiling . . . !

Now we've been singing the praises of Philblack A these many months. We say —"Philblack A aids in making better rubber products." That's *our* opinion. When you use Philblack A and prove it, then it's *your* opinion, too!

PHILLIPS PETROLEUM COMPANY

Philblack Division

EVANS SAVINGS AND LOAN BUILDING · AKRON 8, OHIO

ARE YOU PROTECTING YOUR NATURAL RUBBER COMPOUNDS WITH THE BEST ANTIOXIDANT?

THE NATURAL RUBBER OF 1947 NEEDS BETTER PROTECTION THAN THE 1941 SUPPLY

In 1941 the Standard of the Industry was . . . .

B-L-E

In 1947 the best protection for:

- Oxygen Ageing
- Heat
- Flexing

is still **B-L-E**

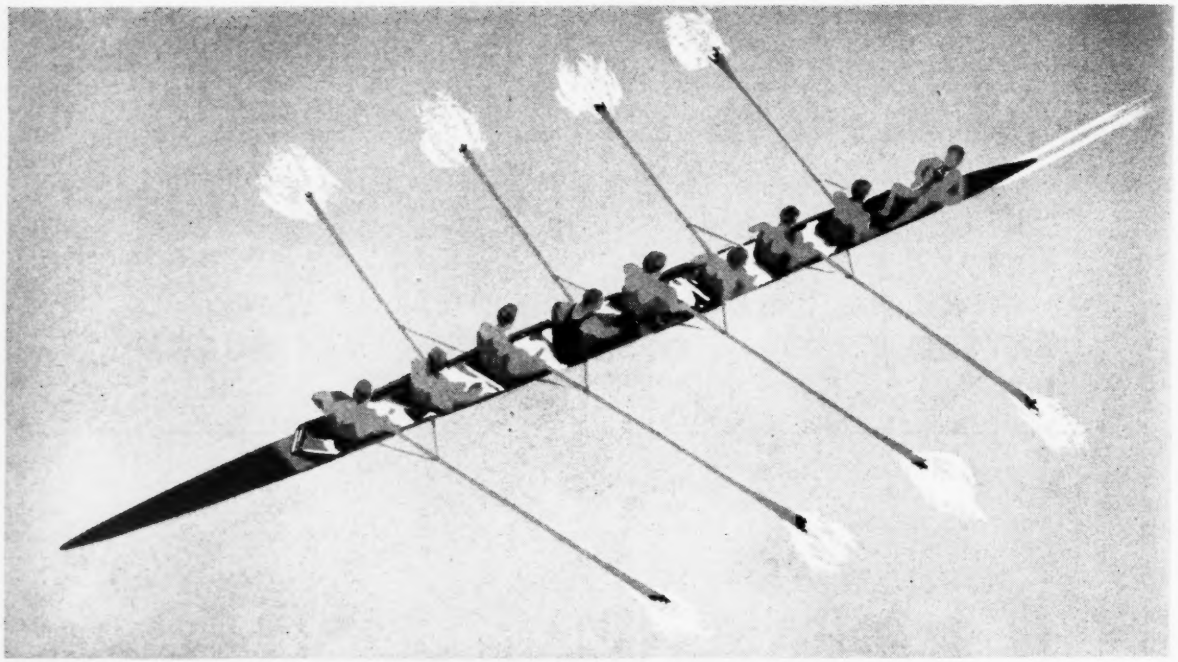
And for plus protection against flexing—weather cracking—copper and manganese—the answer is

FLEXAMINE

●

PROCESS · ACCELERATE · PROTECT
with
NAUGATUCK CHEMICALS

NAUGATUCK CHEMICAL
Division of United States Rubber Company
1230 AVENUE OF THE AMERICAS • NEW YORK 20, N. Y.
IN CANADA: *Naugatuck Chemicals Division, Dominion Rubber Co., Elmira, Ont.*



Perfect communication.. perfect coordination.. MEANS POWER

A power possible only through unison...through the *smooth intercourse* of thousands of separate parts.

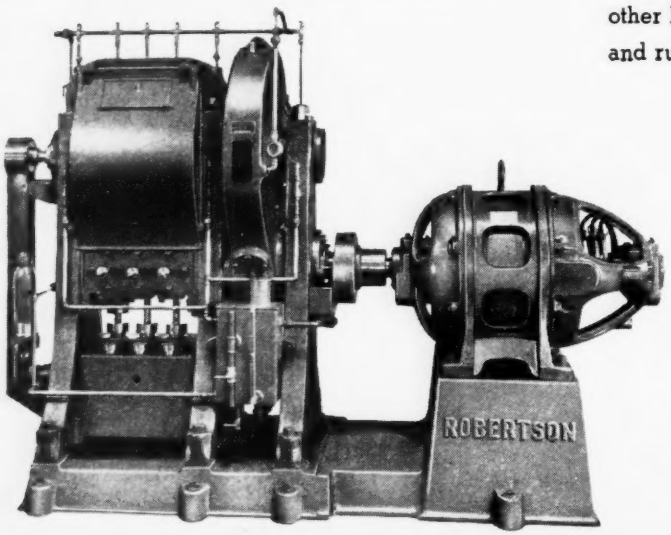
SMOOTH INTERCOURSE

because of precision fabrication and assembly ... done by men skilled from years of experience in making one type of equipment only . . .

ROBERTSON EQUIPMENT

That's how each Robertson High Pressure Hydraulic Pump is made. Each pump is custom built . . . around a standard base plan . . . to individual requirements. Each Pump is the work of master craftsmen.

It is also the reason why Robertson Pumps and other Equipment is used by leading lead cable and rubber hose industries the world over.



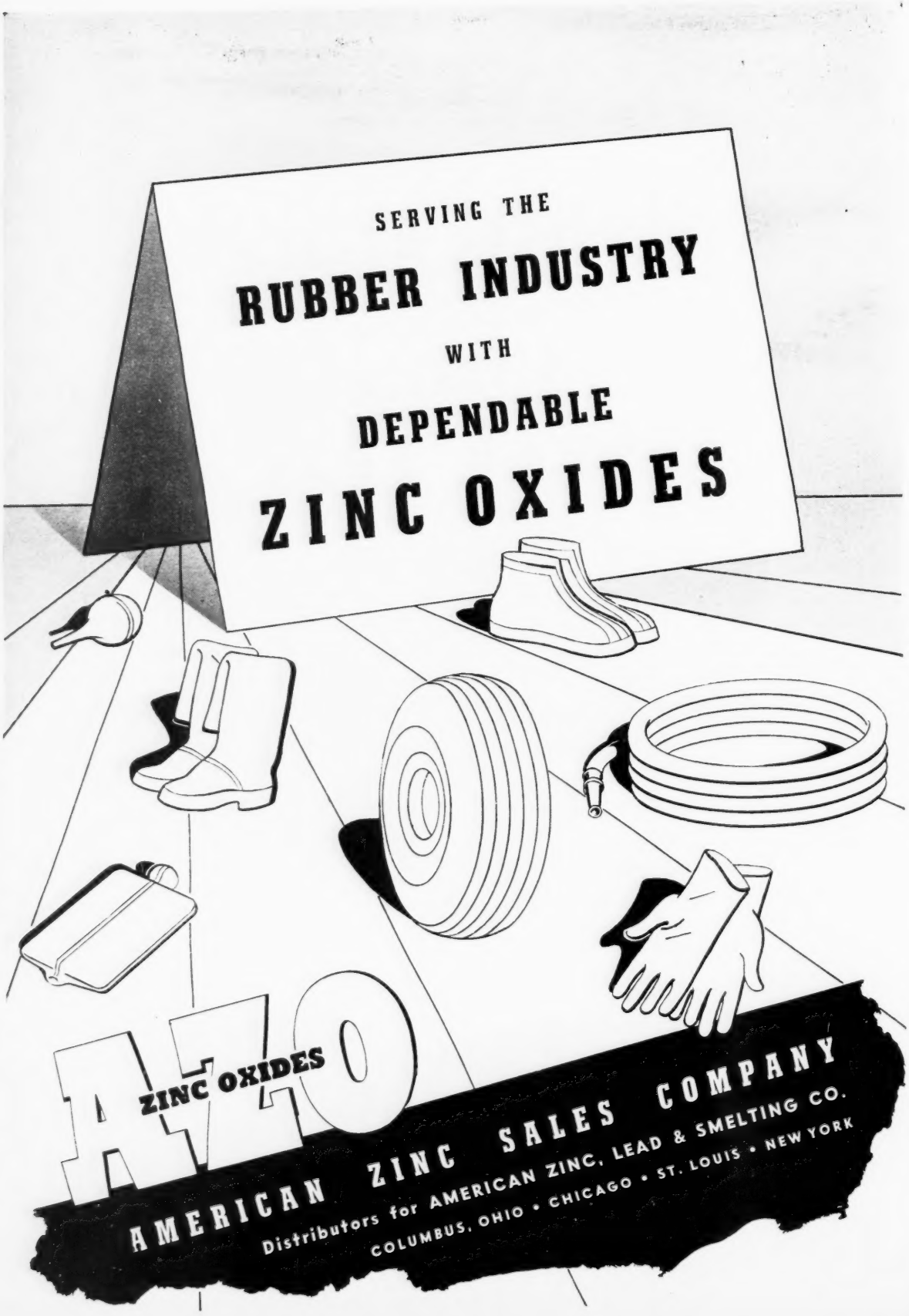
JOHN Robertson
COMPANY, INCORPORATED
125-135 WATER STREET, BROOKLYN 1, NEW YORK
Designers and Builders of all Types of Lead Encasing Machinery
Since 1858

For technical data please write Dept. CA-2

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

ROSE BUILDING, CLEVELAND 15, OHIO


SERVING THE
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WITH
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AMERICAN ZINC SALES COMPANY
Distributors for AMERICAN ZINC, LEAD & SMELTING CO.
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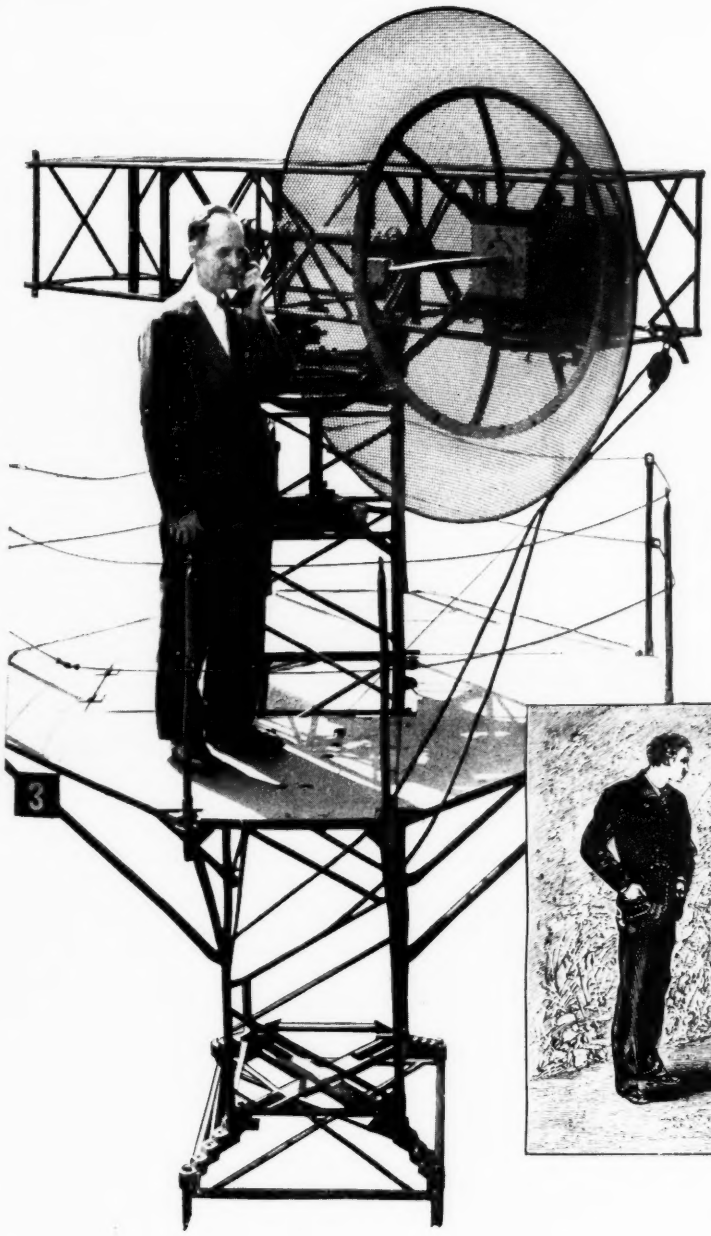
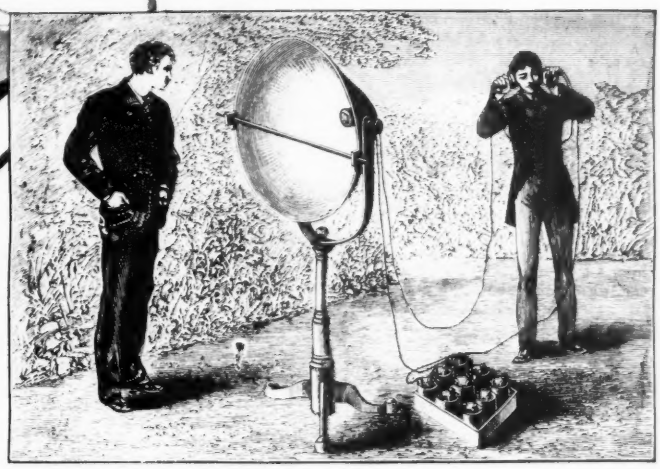


Words that rode on a beam of light



If Alexander Graham Bell could look at the microwave antenna in the illustration, how quickly his mind would go back to his own experiments, 67 years ago!

For in 1880 the inventor of the telephone had another new idea. Speech could be carried by electric wires, as Bell had demonstrated to the world. Could it be carried also by a *light beam?*

He got together apparatus—a telephone transmitter, a parabolic reflector, a selenium cell connected to headphones—and "threw" a voice across several hundred yards by waves of visible light, electromagnetic waves of high frequency.

Bell's early experiment with the parabolic antenna and the use of light beams as carriers was for many years only a scientific novelty. His *idea* was far ahead of its time.

Sixty years later communication by means of a beam of radiation was achieved in a new form—beamed microwave radio. It was developed by Bell Telephone Laboratories for military communication and found important use in the European theater. In the Bell System it is giving service between places on the mainland and nearby islands and soon such beams will be put to work in the radio relay.

In retrospect, Bell's experiment illustrates once again the inquiring spirit of the Bell System.

BELL TELEPHONE LABORATORIES

EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

DOW CORNING SILICONES

VARNISHES
RESINS
FLUIDS
GREASES
SILASTIC*

withstand heat
exclude moisture
resist oxidation

Original rubber gasket — Silastic 180

In a steam autoclave at our plant in Midland, we vulcanize sample extrusions of Silastic, the Dow Corning silicone rubber, at pressures of 25 to 125 pounds—240° to 345° F.

A rubber gasket, with which this autoclave was equipped, failed after 30 days of such service. It developed deep cracks when even slightly flexed. Presumably this gasket was made of the best material that the autoclave maker knew of for the purpose. But it wasn't good enough.

So we made a gasket of Silastic 180. And that Silastic gasket, as the photograph indicates, was still soft and flexible—and serviceable—after 30 days of the same use.

That's the kind of usefulness which more and more engineers are finding in Silastic. This essentially inorganic elastomer is much more heat resistant than any of the organic rubbers. Tests indicate, too, that Silastic 180 and 181 are also more resistant to steam at pressures up to 100 pounds than organic rubbers.

Experience gives us grounds for recommending that Silastic be considered for applications in which exceptional heat, cold and weather resistance, good electrical insulating properties and only moderate mechanical strength are required. More Silastic facts are set forth in leaflet No. U 2-3.

The accompanying table attests the performance of Silastic 180 under 50-pound steam (about 300° F.):

Silastic 180	Before Exposure	After 7 Days Exposure
Weight	11.225	11.189
Thickness	0.135	0.135
Hardness, Shore A Scale	85.	74.
Elasticity, Shore, %	5.	5

*TRADE MARK, DOW CORNING CORPORATION

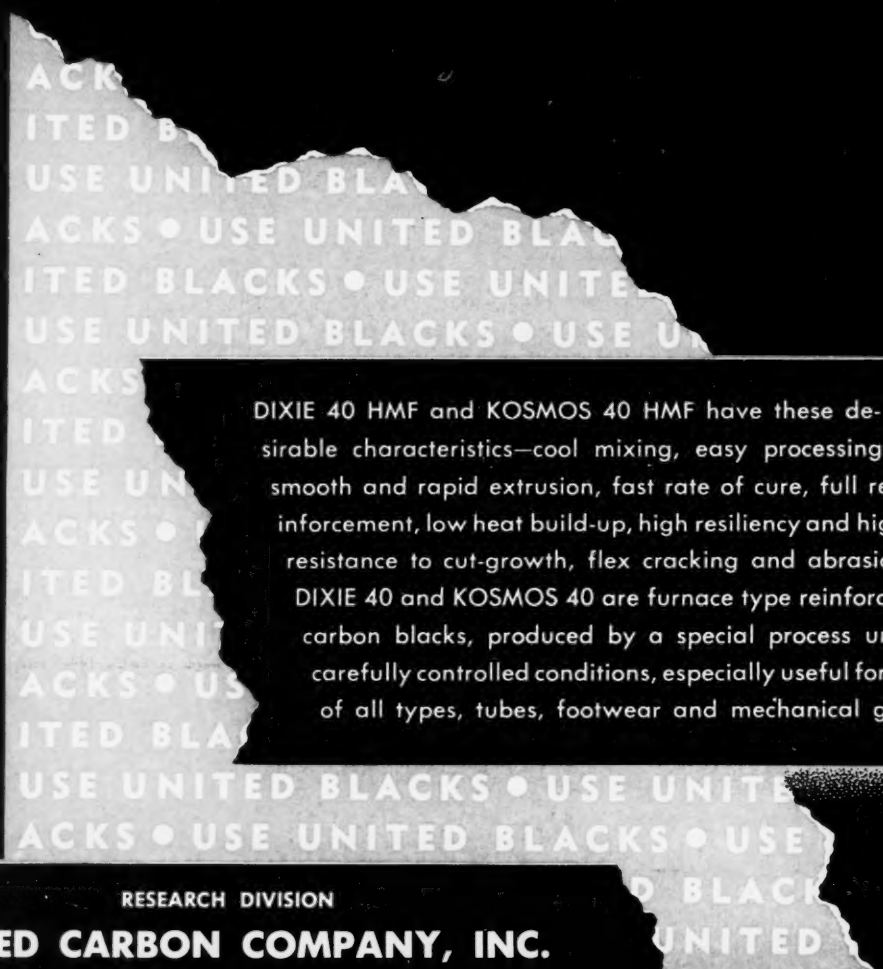
DOW CORNING CORPORATION • MIDLAND, MICHIGAN
New York • Chicago • Cleveland • Los Angeles
In Canada: Fiberglas Canada, Ltd., Toronto
In England: Albright and Wilson, Ltd., London

Dow Corning
FIRST IN SILICONES

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO


USE UNITED BLACKS • USE UNITED BLACKS • USE UNITED BLACKS •

Feb

★

★

NA

★For improving established products...

★For developing new products...

★ American Anode latices and mixes have been widely used in many industries for years—for doll skins and duck decoys, catheters and camera bellows, meteorological balloons and Mickey Mouses, and thousands of other interesting and useful products. As coatings and impregnants for textiles and paper, these modern materials have opened an entirely new field of development.

But we believe the surface has barely been scratched in finding profitable applications for these materials.

That's why we have a large laboratory, equipped with the latest and most modern research and testing equipment, and *staffed with experienced people who know how to use it.*

That's why we offer a *complete* research, design, engineering, and production consultant service.

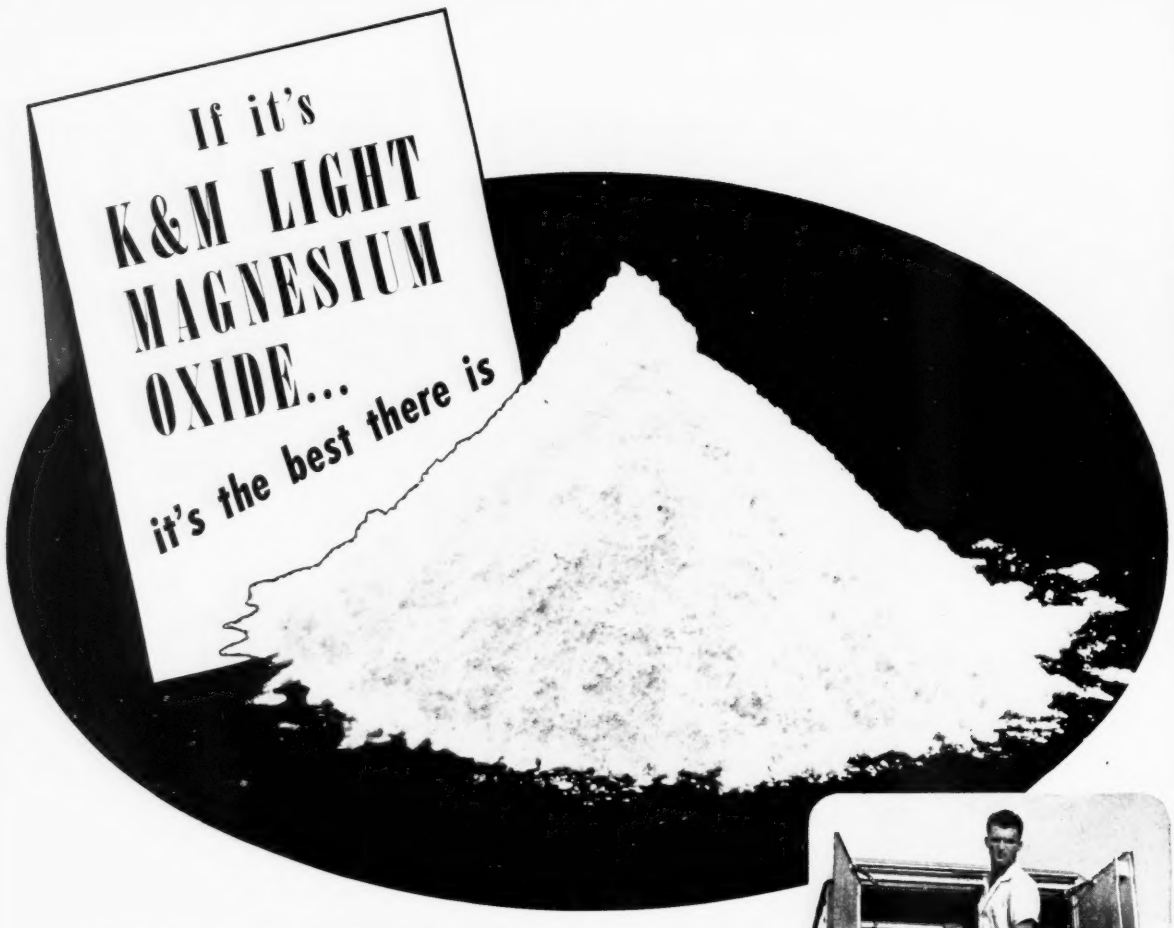
That's why we invite you to come to us with your problems, and take advantage of our years of experience in compounding, development, and manufacturing. The chances are good that we can help improve your present products—equally good that we can help with the development of completely new products made from American Anode latices and mixes.

Latices and compounded mixes of GEON, HYCAR, Saran, neoprene, crude rubber, and GR-S are available. For more information about these modern materials—and *methods of using them*—please write Dept. AH-1, American Anode, Inc., 60 Cherry St., Akron, O.

AMERICAN ANODE

INCORPORATED

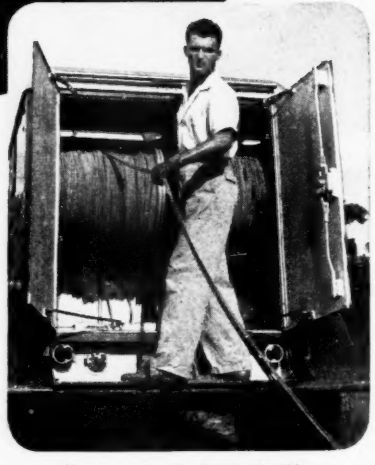
NATURAL AND SYNTHETIC RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS



• In the compounding of neoprene, K&M Light Magnesium Oxide has *proved* that top quality pays off. That is why so many leading neoprene compounders insist on K&M Light Magnesium Oxide.

Originating in crude Dolomite rock, this feather-light powder was carefully developed by America's pioneer manufacturer of magnesia products to meet the specific needs of neoprene compounders. One grade only is produced . . . the *finest*.

K&M Light Magnesium Oxide is available now . . . order it from one of the stock points listed below.



Neoprene-covered seismograph cable
Photo Courtesy: General Geophysical Company

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

One of America's oldest and most reliable makers of asbestos and magnesia products

K&M best in asbestos

OUR DISTRIBUTOR FOR LIGHT MAGNESIUM OXIDE IS:

AMERICAN CYANAMID & CHEMICAL CORPORATION

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WITH SALES REPRESENTATIVES TO THE RUBBER INDUSTRY AND STOCK POINTS:

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LOS ANGELES, CAL., H. M. Royal, Inc.
TRENTON, N. J., H. M. Royal, Inc.

you get up to 30% CARBON BLACK CONTENT in *Buffalo Reclaims!*

Just another reason why BUFFALO RECLAIMS are widely used by rubber compounders—the carbon black content is *high*. From the figures below, you'll see how BUFFALO can help you during the current carbon black shortage!

BUFFALO RECLAIMS	Carbon Black Content	Specific Gravity
8022 Tank Tread Reclaim	30%	1.25
SPECIAL 33 Natural #1 Peel Type	27%	1.16
U. S. 140 GRS Whole Tire Reclaim	23%	1.17

U. S. RUBBER RECLAIMING CO., INC.

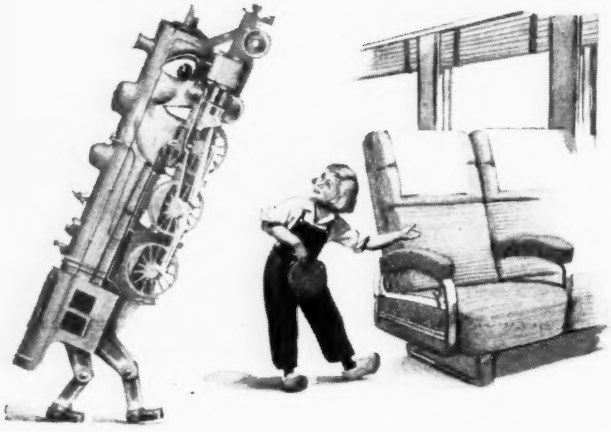
500 FIFTH AVENUE • NEW YORK 18, N. Y. • (Plant at Buffalo, N. Y.)

TRENTON . . . H. M. ROYAL, Inc., 689 Pennington Avenue • TORONTO . . . H. VAN DER LINDE, Ltd., 156 Yonge Street

64 Years Serving the Industry Solely as Reclaimers

From Tires for Planes

...to Seats for Trains



Dutch Boy: "To make a *good* rubber product a *better* rubber product . . . make it with Red Lead."

You: "I suppose you can back up that statement?"

Dutch Boy: "Sure I can. Practical manufacturing experience has borne out our research findings. It *proves* that compounding rubber with #2 RM Red Lead gives the seven advantages listed below."

You: "Don't the advantages depend on what product I'm making?"

Dutch Boy: "They do; for instance, if you make tires all seven advantages apply. But most of them are important with other products, too."

You: "Suppose my base is GR-S. Do they still apply?"

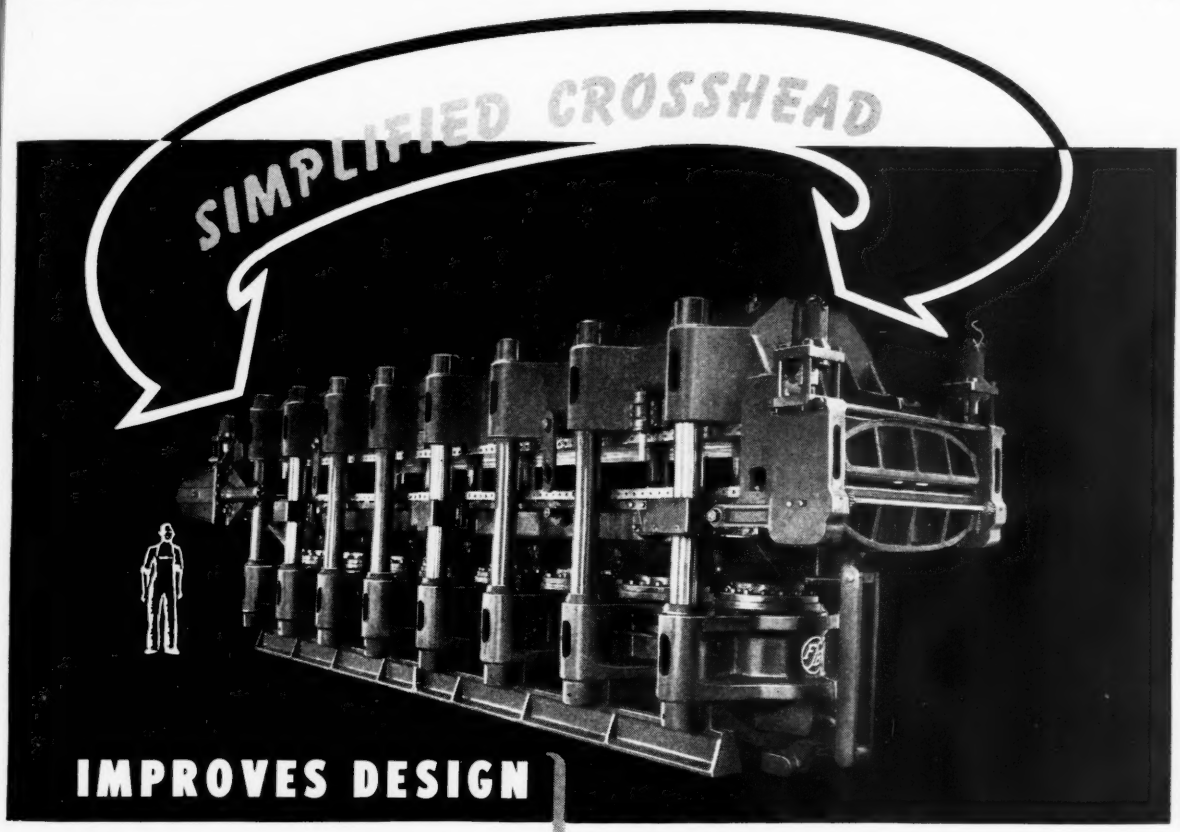
Dutch Boy: "Absolutely—GR-S, GR-S-10, GR-M, GR-A or GR-I. Just let us know your specific application and our technical staff will gladly supply literature and any other information you need. Drop a line to the Rubber Division of our Research Laboratories, 105 York Street, Brooklyn 1, New York."

COMPOUND RUBBER WITH #2 RM RED LEAD FOR 7 GOOD REASONS

1. *Improved Heat Stability—Retention of Elasticity*
2. *Lower Heat Build-up—Cooler Running*
3. *Economical*
4. *Faster Curing Rate*
5. *Extended Curing Range*
6. *Excellent General Physical Properties*
7. *Safe Processing*

NATIONAL LEAD COMPANY—New York 6; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6. (National Lead Co. of Mass.); Philadelphia 7. (John T. Lewis & Bros. Co.); Pittsburgh 30. (National Lead Co. of Pa.); Charleston 27, West Virginia, (Evans Lead Division).

If it's made with RUBBER RED LEAD ... it's better made with



Cast in two sections, each weighing 43,000 pounds, the crosshead of this 60" x 30'0" Farrel-Birmingham belt press, by its mass and design, allows wider center placement of the cylinders. The cylinders are larger than usual, and less than half the number are required than in a similar type press with individual top crosshead for each cylinder. The smaller number of cylinders means fewer moving and wearing parts, which minimizes packing replacement and other maintenance.

The press exerts a pressure of 280 pounds per square inch on the platen area, or a total load of about 3100 tons, by means of eight 22" diameter rams operating under hydraulic pressure of 2000 lbs. per square inch.

Other features that improve operating efficiency include:

POSITIVE EQUALIZING DEVICE connected with the follower crosshead keeps the bottom platen at true level when press is opening or closing.

DESIGN OF STRETCHER AND CLAMP UNIT allows the stretcher reaction load to be absorbed and balanced by the middle and top members of the press structure.

EDGING DEVICE of new design, fitted to the bottom platen with its actuating mechanism outside the platen area, permits curing belts of practically full platen width.

Complete details of this belt press or of any of the other production units listed on this page are yours for the asking. FB-365

F-B PRODUCTION UNITS

- Banbury Mixers
- Plasticators
- Pelletizers
- Mixing, Grinding Warming and Sheeting Mills
- Bale Cutters
- Tubing Machines
- Refiners
- Crackers
- Washers
- Calenders
- Hose Machines
- Hydraulic Presses and other equipment for processing rubber and plastic materials.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, Stonington, New York, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston, Charlotte

Farrel-Birmingham

Get Rid of the "DUST NUISANCE"

INVITE MAN POWER!

GLYCERIZED

(LIQUID CONCENTRATE)

LUBRICANT

. . . . GLYCERIZED eliminates annoying "DUST" arising from the use of talc, soapstone, whiting or clay. A clean mill room, free from dust, is the goal of every rubber manufacturer. *Make your mill room a healthful, inviting place to work in by doing away with all 'dust'.*

. . . . Banbury or mill mixed stocks may be dipped in a 2 to 5% water solution of GLYCERIZED LUBRICANT for 10 to 30 seconds and hung on racks to cool and dry. After 30 to 40 minutes, the slabs are cool and dry enough to pile. GLYCERIZED reduces the surface tension of the water and insures complete wetting of the surface of the slab. Adhesion is nullified!

. . . . Use GLYCERIZED in your extruding operations—as a mold lubricant—for coating mandrels and cores—belt drums—air bags—washing and finishing inner tubes—processing of insulated wire and cable—all with gratifying results.

. . . . GLYCERIZED *is adapted to all types of synthetic rubbers as well as to natural rubber, reclaim or mixtures!*

GET THE GENUINE from GENSEKE

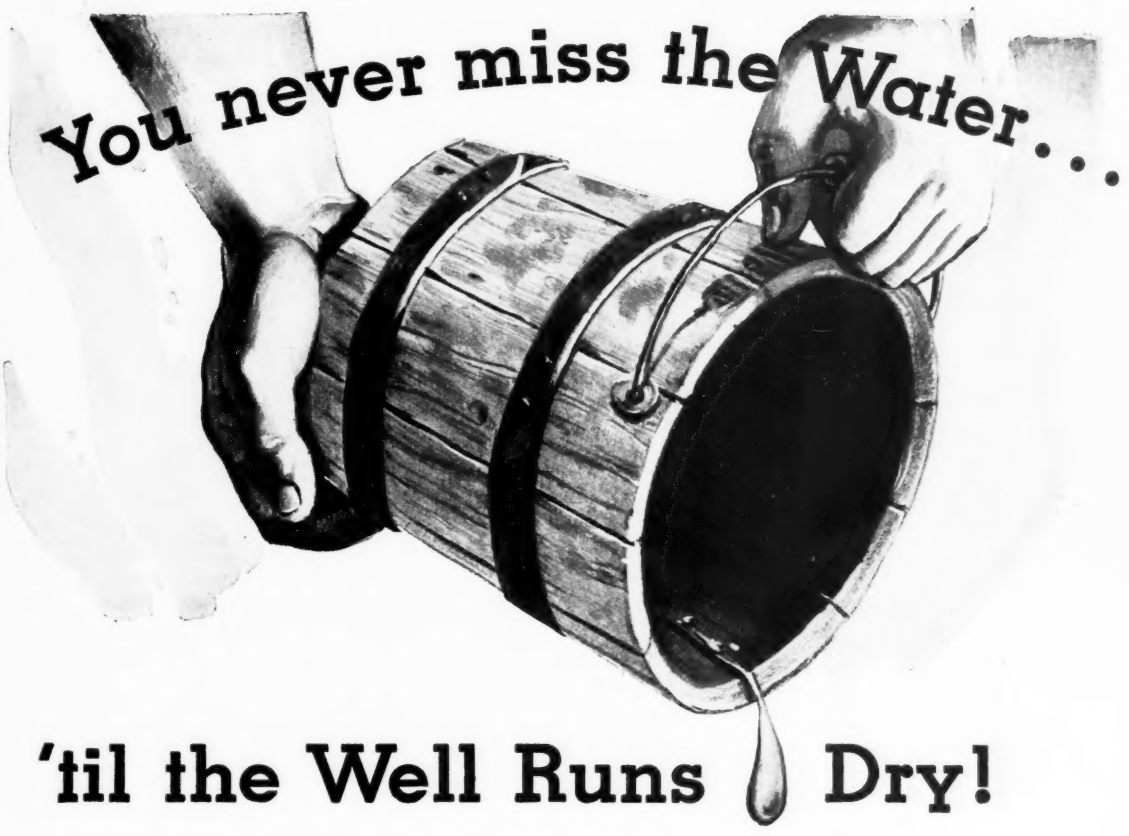
AVAILABLE ONLY IN DRUMS AND HALF DRUMS.

QUALITY SINCE 1884

GENSEKE BROTHERS

RUBBER MATERIALS DIVISION

West 48th Place and Whipple Street Chicago 32, U.S.A.



'til the Well Runs Dry!

WHEN scrap rubber is needed, it is usually needed in a hurry—and only a large, well-established organization can afford to maintain the large inventories necessary to produce it in the quantity you want . . . precisely when you want it. Getting the right materials to the right place at the right time is a specialized art. It's compounded of experience, foresight, skill and familiarity with *all* the ways to get the job done the *right* way . . . quickest and best.

Yes, it's a specialized art . . . but it's one at which we have been excelling for well over forty years.

H. MUEHLSTEIN & CO. INC.

122 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: New York • Akron • Chicago • Boston • Los Angeles • Memphis

WAREHOUSES: Jersey City • Akron • Boston • Los Angeles • Memphis

Biggs

VULCANIZERS and DEVULCANIZERS Have Served the Rubber Industry for More Than 45 Years

Fig. 1—15-ft. diameter by 45-ft. long horizontal vulcanizer with quick-opening door for vulcanizing rubber linings in large storage tanks. *Fig. 2*—Biggs vulcanizer with special heating manifolds and circulating fan; all sizes, various working pressures.

BIGGS-built vulcanizers and devulcanizers have occupied a prominent place in the development of the rubber industry since its inception. For more than 45 years Biggs has furnished single-shell and jacketed vulcanizers both vertical and horizontal, as well as many different types of devulcanizers to meet various requirements of the reclaim experts. . . . It is a far cry from the old days of bolted doors and riveted construction to Biggs modern all-welded units with quick-opening doors. Biggs vulcanizers and devulcanizers are available in all sizes and for various working pressures — with numerous special features. *Write now for our Bulletin 45.*

Fig. 3 — vertical vulcanizer with quick-opening door. Door is handled by self-contained arm and gear-operating mechanism. Hand or motor operation.

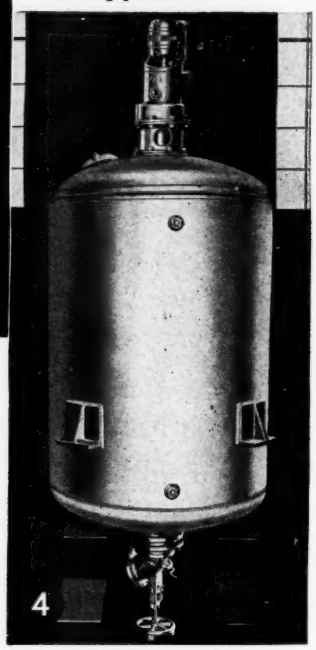
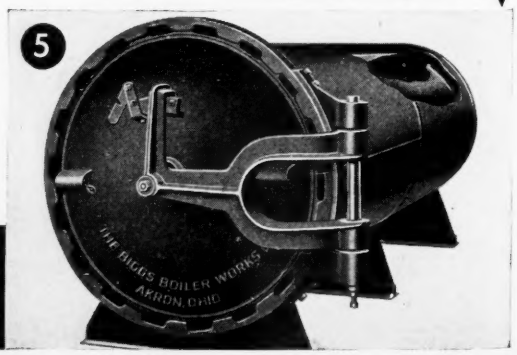


Fig. 4—high pressure heavy duty jacketed vertical devulcanizer with special agitator. Furnished in various sizes.

Fig. 5—horizontal steam-jacketed vulcanizer with hinge type quick-opening door; all sizes, for various working pressures. Welded construction throughout.



BIGGS-WELD

THE *Biggs* BOILER WORKS CO.

1007 BANK STREET, AKRON 5, OHIO, U.S.A.

★ ARE YOU SHORT SOMETHING

★ Would it be Pine Tar as a Softener for Rubber?

★ Have You Tried RESINEX L-4?

That problem of finding a suitable softener for rubber may well be answered with RESINEX L-4. . . . In these times of shortages of softeners formerly used, RESINEX L-4 is being used in an increasing number of plants with results comparable with the best of the old-line rubber softeners. . . . There is an abundant supply of RESINEX L-4—and it is quite economical in cost, too. . . . We have a laboratory bulletin showing comparative results between Pine Tar and RESINEX L-4. It contains information that may be surprisingly important to you. Write for a copy.

HARWICK STANDARD CHEMICAL CO.

AKRON 8, OHIO

Branches: Boston . . . Trenton . . . Chicago . . . Los Angeles

What characteristics do you require in Zinc Oxides?

The St. Joseph Lead Company produces specific types or grades of lead-free zinc oxides for the rubber, paint and other zinc oxide consuming industries. Irrespective of what your individual requirements may be, you will find that the pigment recommended by our technical staff will possess the characteristics considered most desirable for your particular purpose.

St. Joe lead-free Zinc Oxide is produced direct from our own ore by a patented Electro-Thermic Process which permits unusually close control to be exercised in every phase of production. This makes it possible to maintain the exceptionally high standards of quality and uniformity for which St. Joe Zinc Oxides are recognized throughout the consuming industries.

ST. JOSEPH LEAD COMPANY

250 PARK AVENUE • NEW YORK 17 • ELdorado 5-3200

Plant & Laboratory: Josephtown, Beaver County, Pennsylvania

Showing microscope and equipment for examination of physical characteristics and particle size of St. Joe Zinc Oxide in our laboratories at Josephtown, Pa.

ST. JOE Lead-Free ZINC OXIDE

versatile non-volatile compatible

INDONEX
plasticizers

633½
634½
638½

VG

FOR NATURAL AND SYNTHETIC RUBBERS
(Bulletins 13 and 13A)

FOR VARIOUS NATURAL AND SYNTHETIC RESINS* AND FOR ASPHALTIC COMPOSITIONS

FOR VINYL COMPOUNDS
(Circular 101)

*Send for Resin Compatibility Data

STANDARD OIL COMPANY (INDIANA)
CHEMICAL PRODUCTS DEPARTMENT
910 SOUTH MICHIGAN AVENUE CHICAGO 80, ILLINOIS

INDOIL
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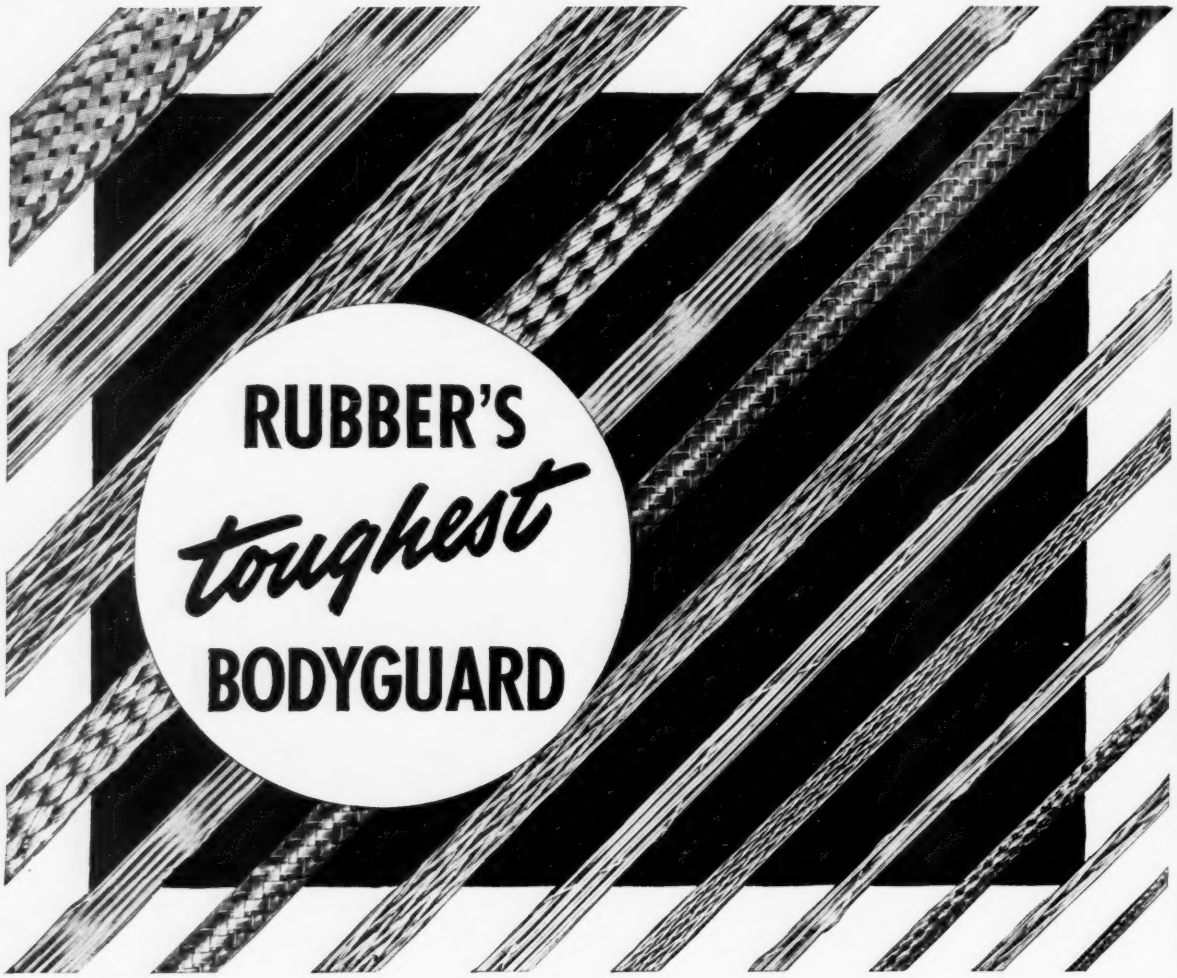

ALMOST 40 years ago we started a job here at National-Standard that's grown bigger and bigger with each passing year. That job is the application of fine wire to rubber—to support rubber and greatly extend its usefulness . . . to give rubber products unprecedented strength and life.

Today you have only to look at the amazing work records of wire-reinforced products to realize that wire has become rubber's toughest, most capable bodyguard—in tires, V-belts, flat belts, conveyor belts, tubes, conduit, hose, and scores of other products.

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As always, we at National-Standard welcome the opportunity to work with you in the planning of your products. Perhaps you too stand to gain with a specially developed wire or fabrication. Possibly we can also contribute in the development of cost-saving machinery for the application of your wire. In any case, our specialized engineering service is at *your* service, now, or at any time.

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The Amazing ELMES HYDROLAIRS

(Patents Applied For)

A New Operating Principle . . . New Effortless Performance, New Economy . . . for Molding Rubber

Bulletin 1036 gives Models, Sizes, Capacities, Dimensions, and Complete Specifications. It's yours for the asking.

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Hydrolairs give you *effortless* lever control; *rapid* platen advance; maximum pressure instantly. They apply and maintain any desired pressure—and *repeat* at that pressure until reset.

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ETHYL TUADS†
(TETRAETHYLTHIURAM DISULFIDE)

METHYL TUADS†
(TETRAMETHYLTHIURAM DISULFIDE)

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(SELENIUM DIETHYLDITHIOCARBAMATE)

BUTYL ZIMATE†
(ZINC DIBUTYLDITHIOCARBAMATE)

ETHYL ZIMATE†
(ZINC DIETHYLDITHIOCARBAMATE)

METHYL ZIMATE†
(ZINC DIMETHYLDITHIOCARBAMATE)

†Tradenames of R. T. Vanderbilt Co. The above Sharples products are sold to the Rubber Industry exclusively by R. T. Vanderbilt Co., 230 Park Ave., New York 17, N. Y., to whom all inquiries concerning their use in rubber should be addressed.

INTERMEDIATES FOR SYNTHESIS OF RUBBER CHEMICALS

MONOETHYLAMINE
DIETHYLAMINE
TRIETHYLAMINE
MONOBUTYLAMINE
TRIBUTYLAMINE
DIETHYLAMINOETHANOL
DIBUTYLAMINOETHANOL
ETHYLETHANOLAMINES
DIBUTYLAMINE

POLYMERIZATION CONTROLLER

***3B MERCAPTAN**
(tertiary dodecyl mercaptan)

VULCANIZING AGENTS

***VULTAC No. 1**
(alkylphenol sulfide)

***VULTAC No. 2**
(alkylphenol sulfide)

***VULTAC No. 3**
(alkylphenol disulfide)

SOLVENTS

DICHLOROPENTANES
MIXED AMYL CHLORIDES

PLASTICIZER

DIAMYLPHENOL

*Sharples Registered Tradename. Further information relating to the above products, together with samples, will be supplied promptly upon request.

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Sharples Chemicals Inc.

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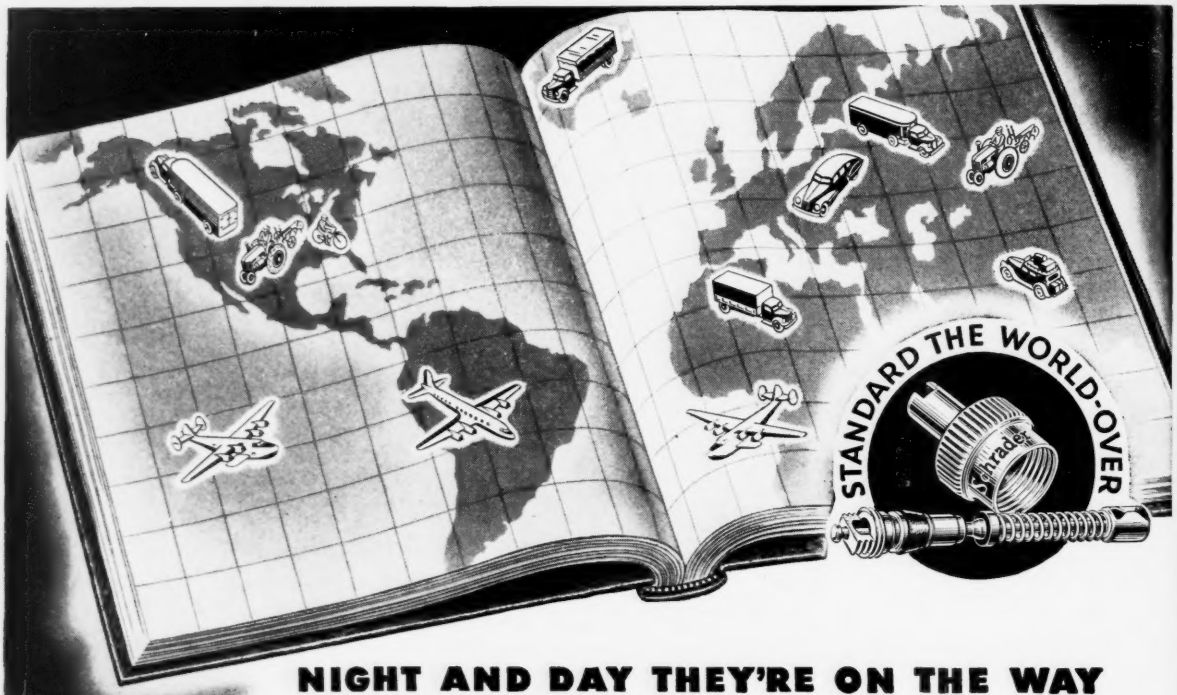

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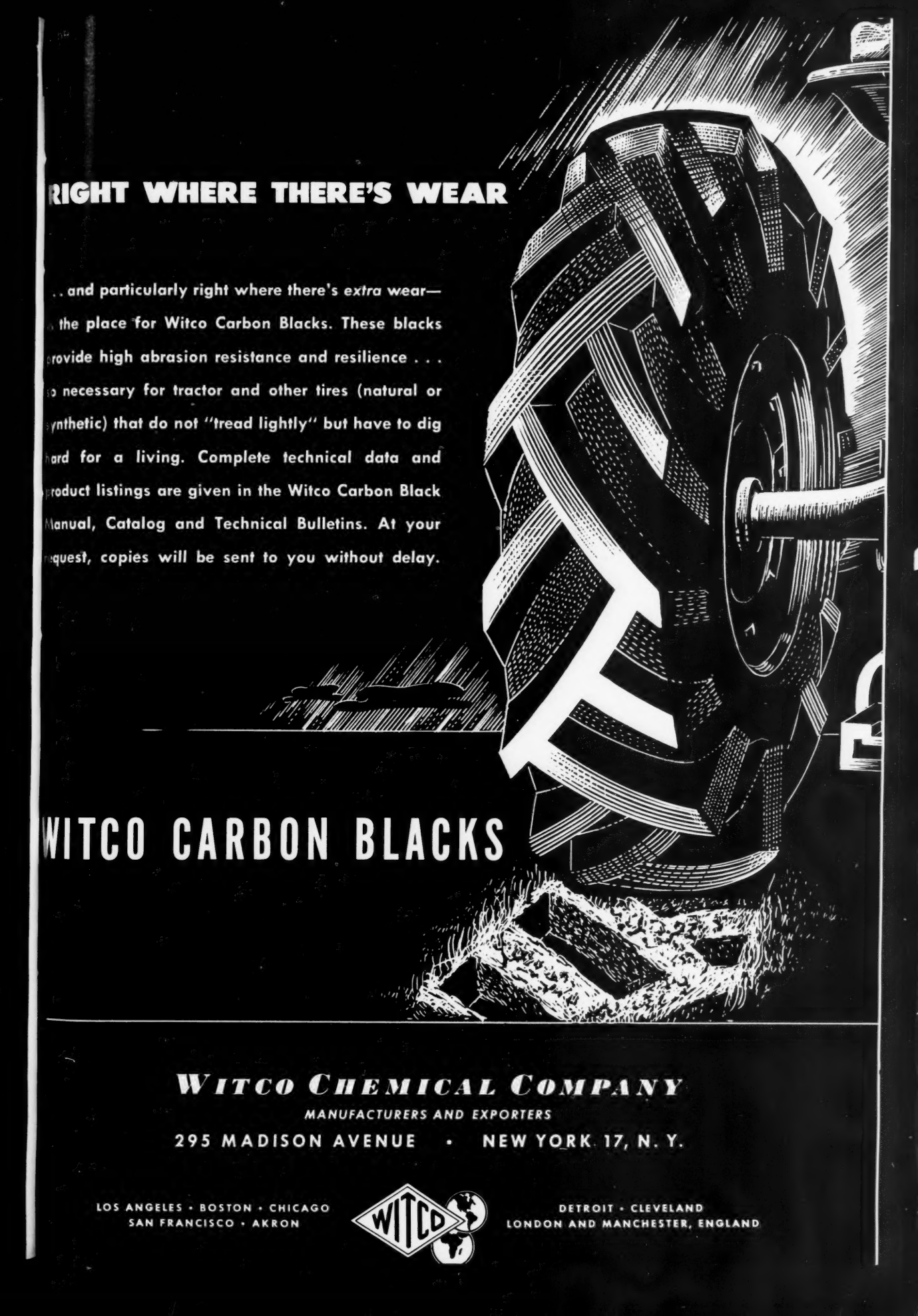
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the place for Witco Carbon Blacks. These blacks
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CONTINENTAL F... imparts exceptionally high resistance to abrasive wear. Tensile, tear and hardness high; rebound and plasticity comparatively low.

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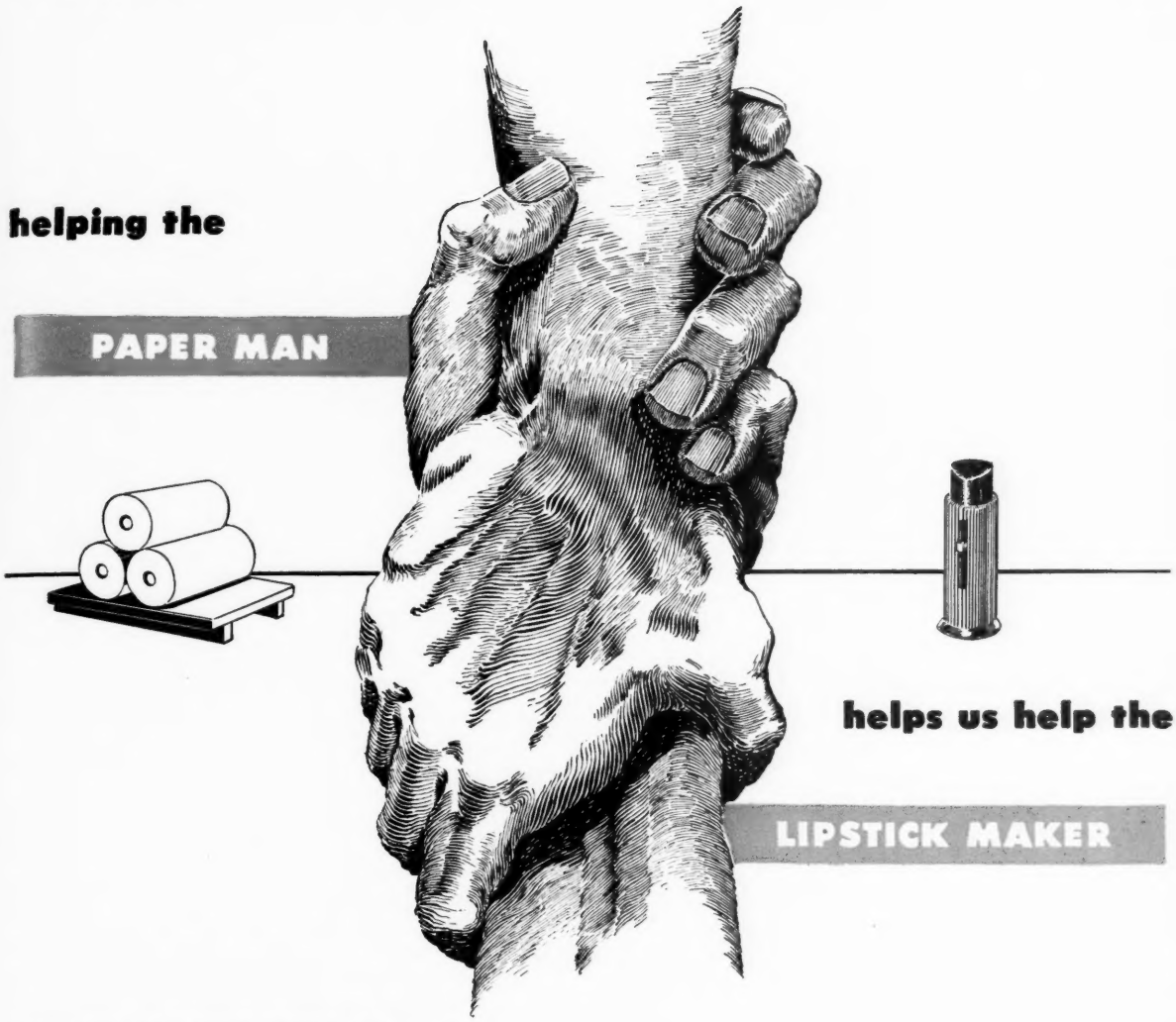

Whittaker sells minerals, colors and pigments to a lot of different users—and that's good for you. Surprising how many times a product or grade we've developed for one industry has helped us serve some unrelated field better. Call it perspective, diversification, over-all experience, or what you will—fact is it's an important *plus* that Whittaker offers along with the quality standards and controls you'd expect from any good house. Want help on some specific problem? Contact a Whittaker sales representative, or write: Whittaker, Clark & Daniels, Inc., 260 West Broadway, New York 13, N. Y.

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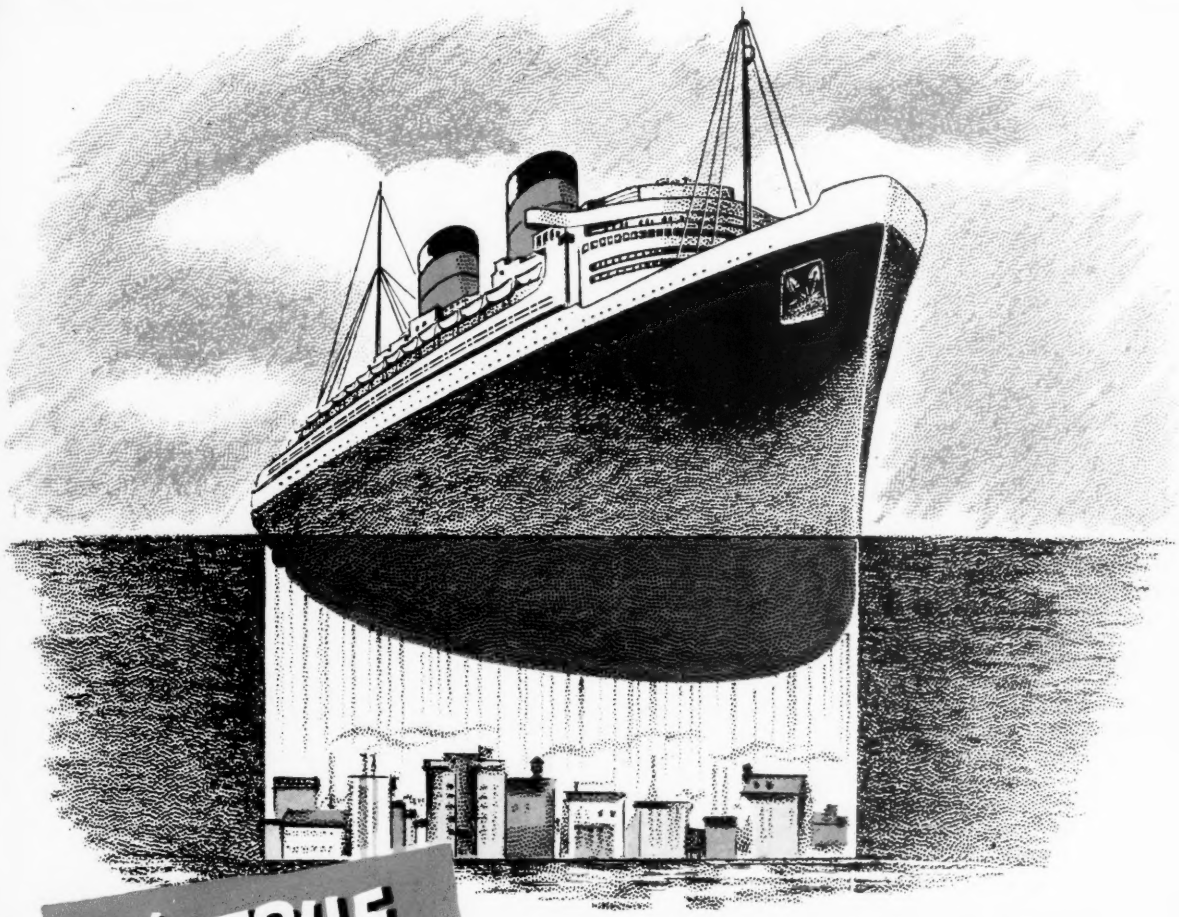
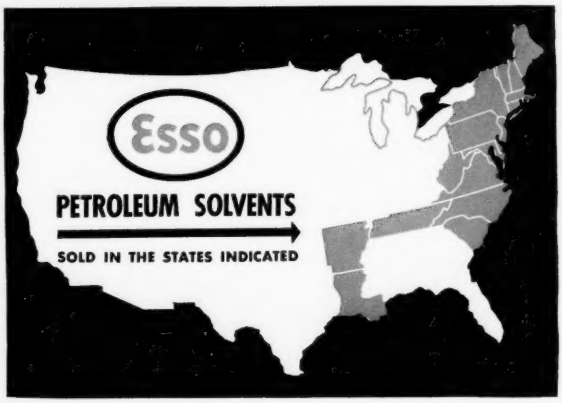


IT'S TRUE...

THE LINER QUEEN ELIZABETH DISPLACES ABOUT THE SAME AMOUNT OF WATER THAT THE CITY OF BALTIMORE, MD. USES IN A DAY!



STANDARD OIL COMPANY OF NEW JERSEY
Elizabeth, N. J.—Baltimore, Md.—Richmond, Va.—Charleston, W. Va. Charlotte, N. C.—Columbia, S. C.—New Orleans, La.—Little Rock, Ark. Memphis, Tenn.

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COLONIAL BEACON OIL COMPANY
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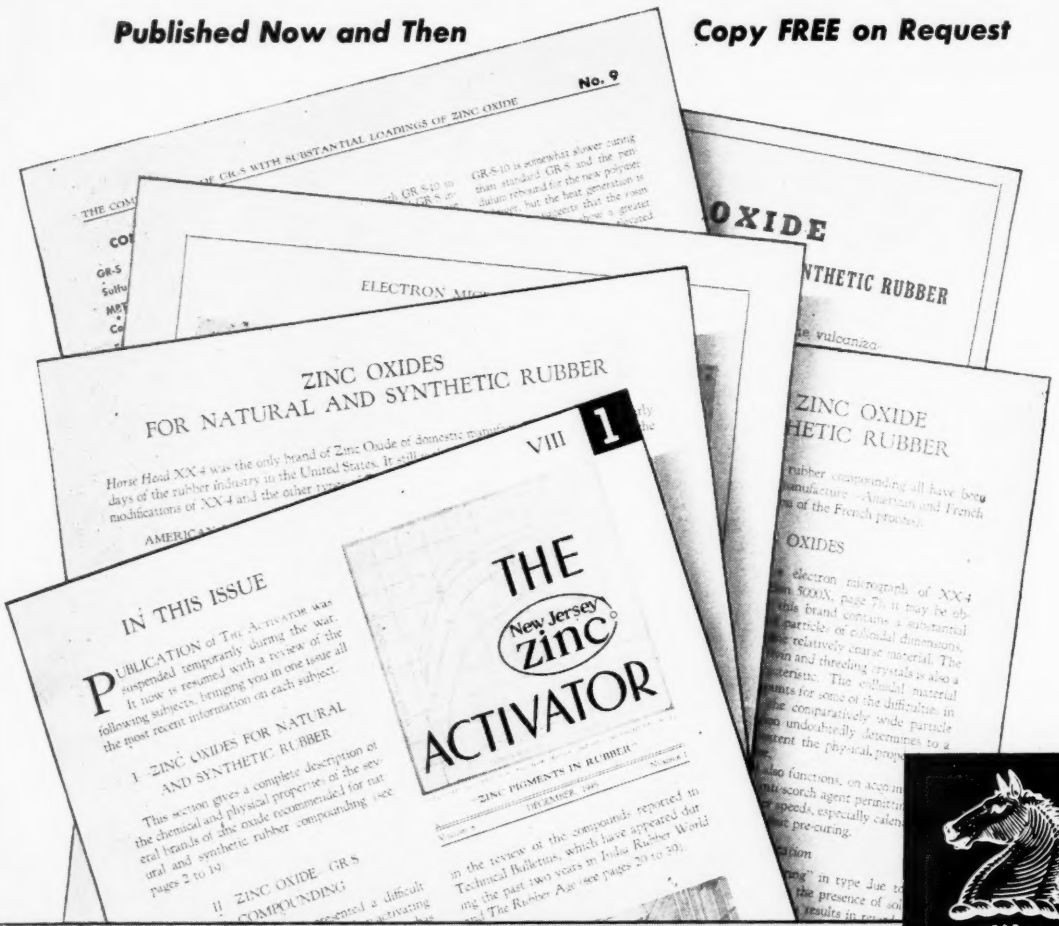
THE TOTAL GALLONAGE OF **ESSO SOLVENTS** SOLD LAST YEAR WOULD FLOAT ALMOST 5 SHIPS THE SIZE OF THE QUEEN ELIZABETH!

Careful manufacturing control is the important factor in the production of Esso Petroleum Solvents. In this way we maintain the correct combination of physical attributes in any specific solvent. Hundreds of industries depend on the constant suitability and uniformity in solvents that the Esso trademark assures. See your Esso Representative next time you order.

A New Issue of THE New Jersey Zinc ACTIVATOR *is in the Mail*

AFTER temporary suspension because of the war, publication of THE ACTIVATOR is resumed with the issue of December, 1946, Volume 8, Number 1, which now is in the mails. It contains 44 pages of information on "Zinc Oxides for Natural and Synthetic Rubber" and "Zinc Oxide—GR-S Compounding". If you do not receive THE ACTIVATOR in the next few days, we shall be glad to send you a copy FREE on request.

Published Now and Then ***Copy FREE on Request***



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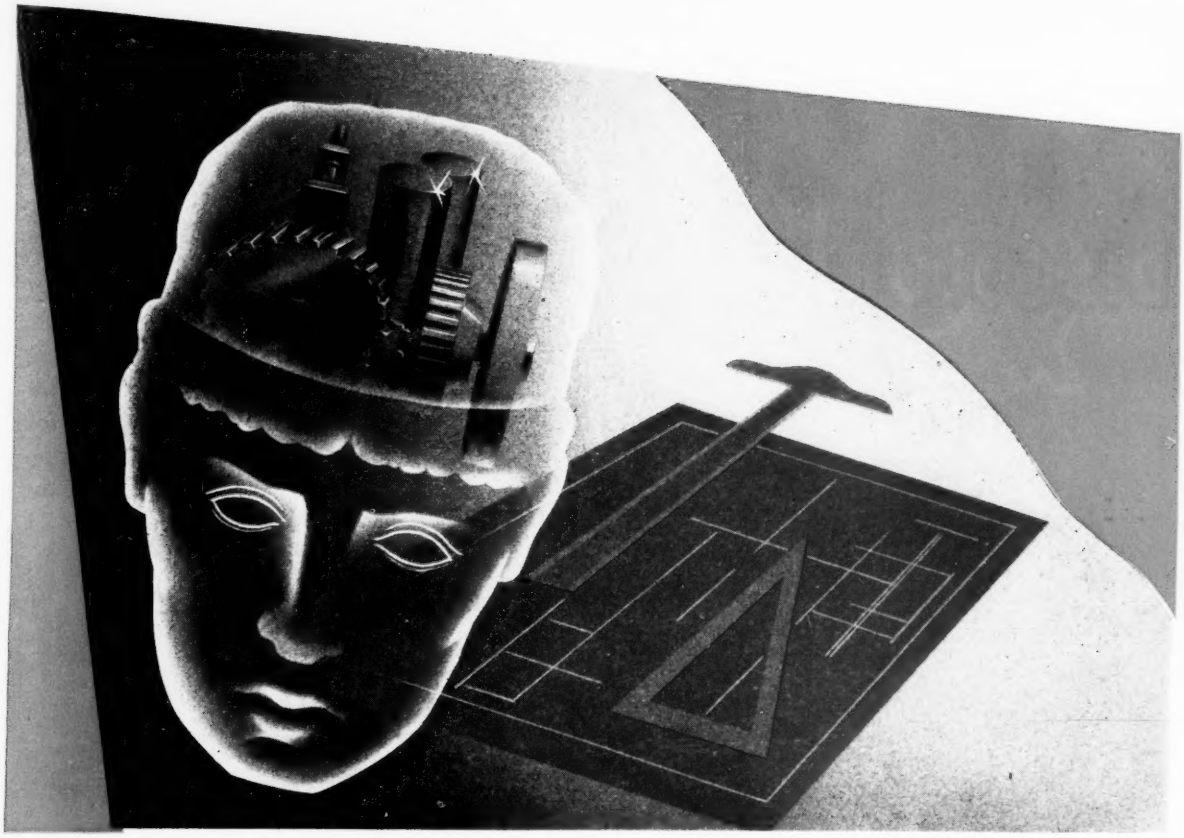
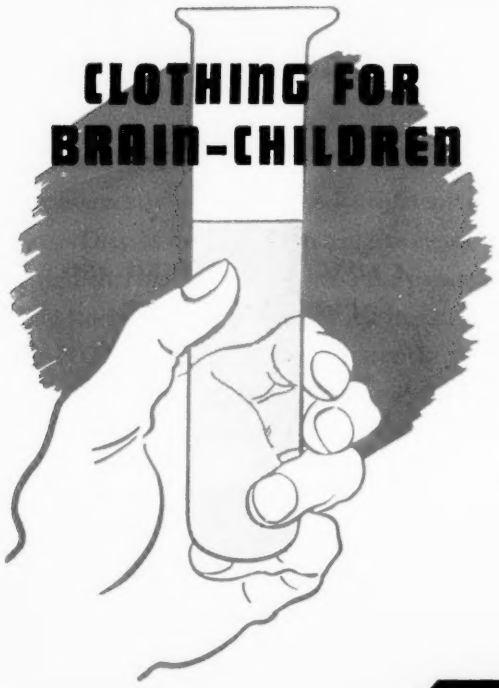


CLOTHING FOR BRAIN-CHILDREN



Perhaps you're mulling over a bright idea in your mind . . . maybe it's even reached the blue print stage. When you arrive at the "finishing point" it's time to talk it over with Stanley. Our sole specialty is creating finishing formulas for industry's brain-children and our experience covers a broad range of products. Inquiries incur no obligation . . . write to the Stanley Chemical Company, manufacturers of Stanley Enamels, Synthetics, Lacquers and Japans, East Berlin, Connecticut.

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Stabilizes Vinyl Chloride Plastics and coatings against heat and exposure discoloration.

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Transparent
Colorless
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Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

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A LONG ESTABLISHED AND PROVEN PRODUCT

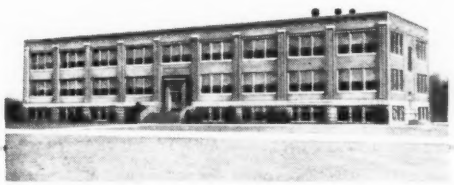
THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

. . . a little goes a long way

Rubber manufacturers who use TITANOX know how economically it whitens and brightens their products. They know they're getting titanium dioxide pigments high in effectiveness for natural or synthetic stocks or for white or tinted items.

TITANOX pigments are consistently good-working, too. Their extremely fine particle size, ease of dispersion, and high refractive index make for greater brightening power. In colored rubber, TITANOX imparts an appealing clarity of tint.

Our Technical Service Department will be glad to help solve your pigmentation problems. Consult them through the nearest Titanium Pigment Corporation address.



Industry has profited by a host of basic advances in titanium pigment pioneered in research laboratories such as this one at Sayreville, New Jersey. Here highly experienced technicians experiment constantly to improve existing grades of TITANOX pigments and to develop new types.

TITANOX

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A Wax for Improved Resistance to Atmospheric Cracking

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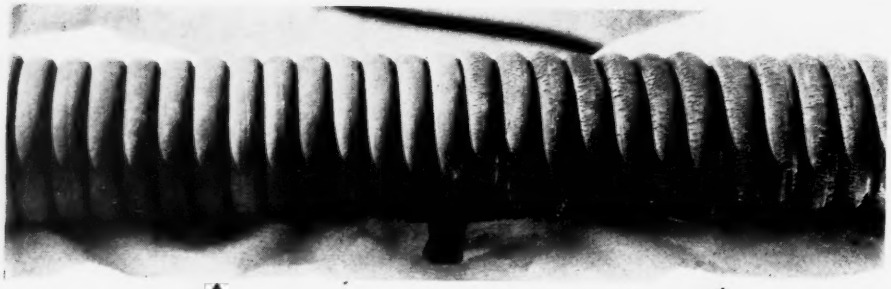

4% Antisol **No Antisol**

Garden Hose
Air Hose
Steam Hose
Proofed Goods
Automotive Products
Refrigerator Gaskets

Does not stain or discolor.

RUBBER H AND M PIGMENTS Chemicals

Photographs of service station showing hose in service and close up of hose with and without 4 per cent of Antisol after six months of service. Samples were bent around a mandrel before photographing to show cracking.

HERRON BROS. & MEYER
82 BEAVER ST., NEW YORK 5, N. Y.
516 OHIO BUILDING, AKRON, OHIO
SUPPLIERS OF RUBBER CHEMICALS

UN

UNITED
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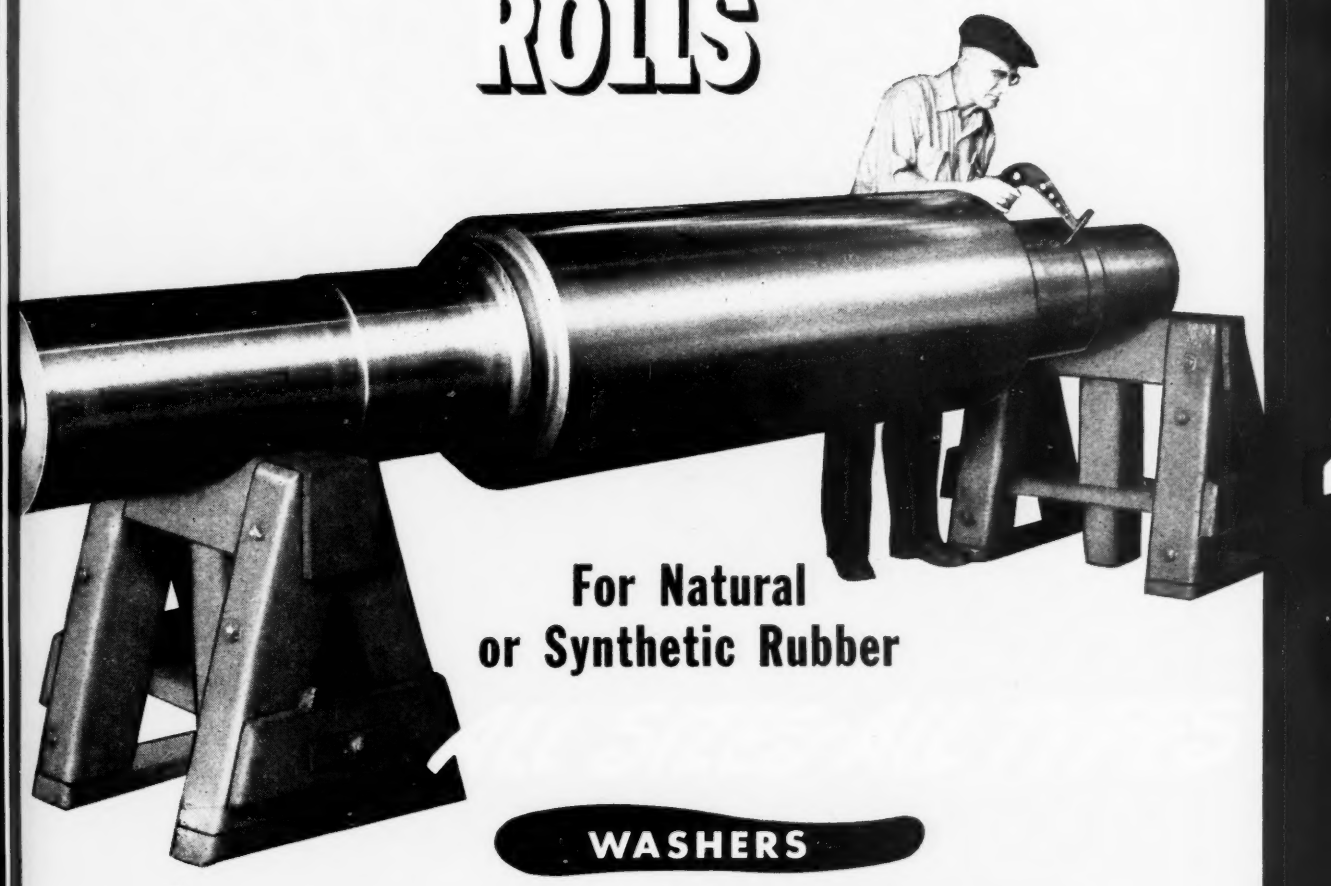
ROLLS



For Natural or Synthetic Rubber

WASHERS

CRACKERS

REFINERS

MILLS

CALENDERS

Whether you need rolls for renewals in present equipment, or specially designed rolls for radically new processing requirements, consult UNITED engineers. The advantages of their metallurgical and technological research, obtained through more than 30 years experience in design and manufacture of rolls for the rubber industry, are at your service.

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Subsidiary: Adamson United Company, Akron, Ohio
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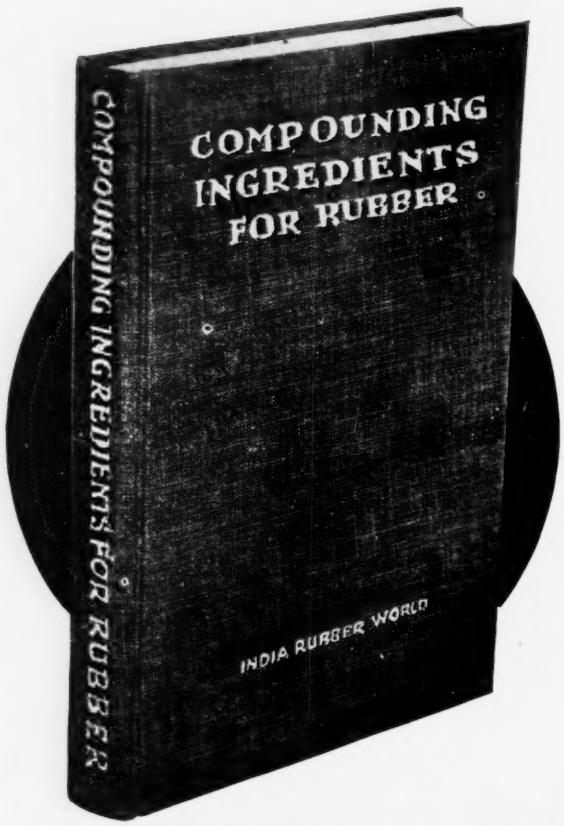

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PUBLICATION DATE

ABOUT MARCH 1, 1947

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COMPLETELY REVISED EDITION

OF

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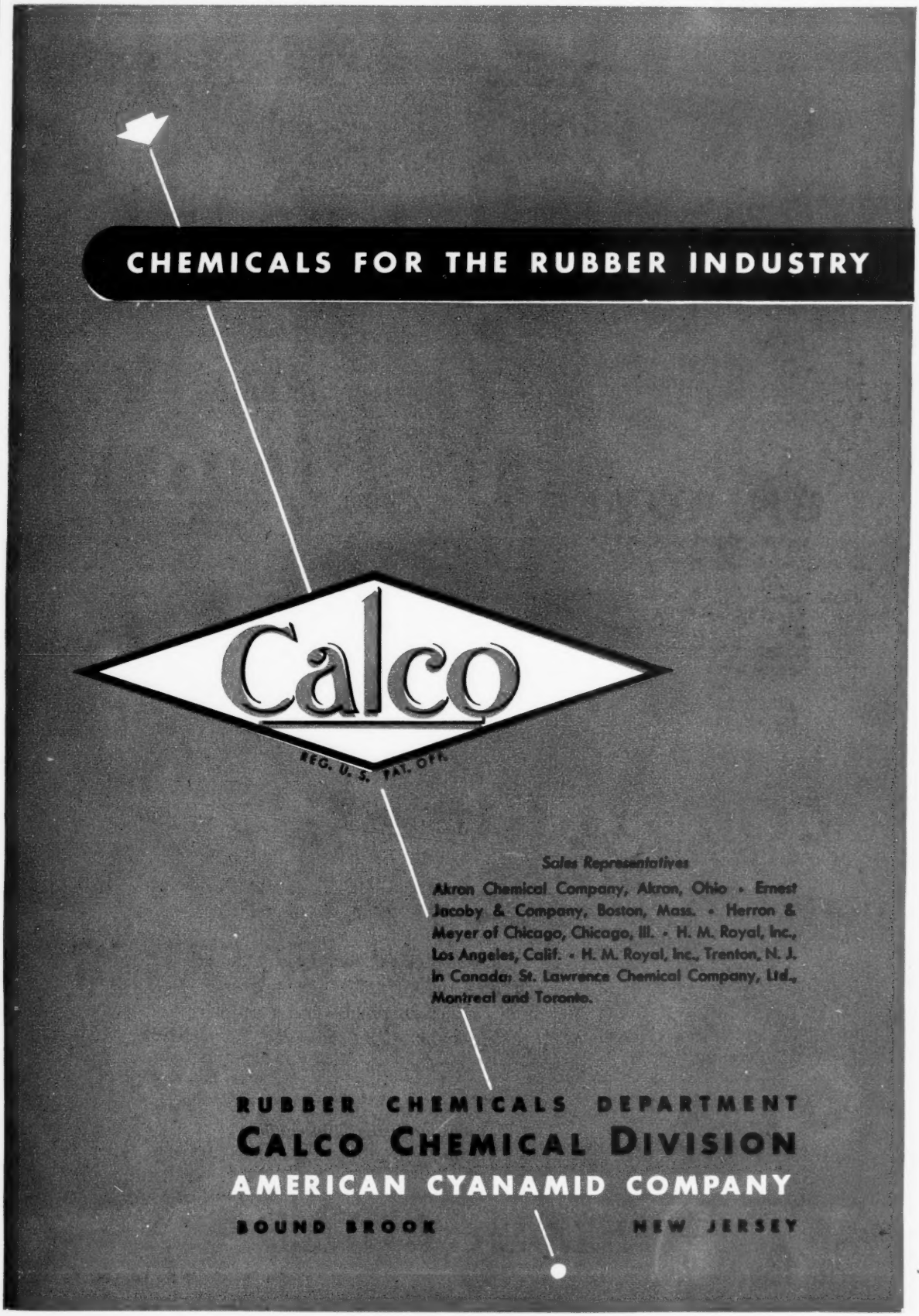
The new book will present information on some 2,000 separate products as compared to less than 500 in the first edition, with regard to their composition, properties, functions, and suppliers, as used in the present-day compounding of natural and synthetic rubbers. There will also be included similar information on natural, synthetic, and reclaimed rubbers as the essential basic raw materials. The book will consist of over 400 pages, cloth bound for permanence.

INDIA
RUBBER WORLD

386 FOURTH AVE. **NEW YORK 16, N. Y.**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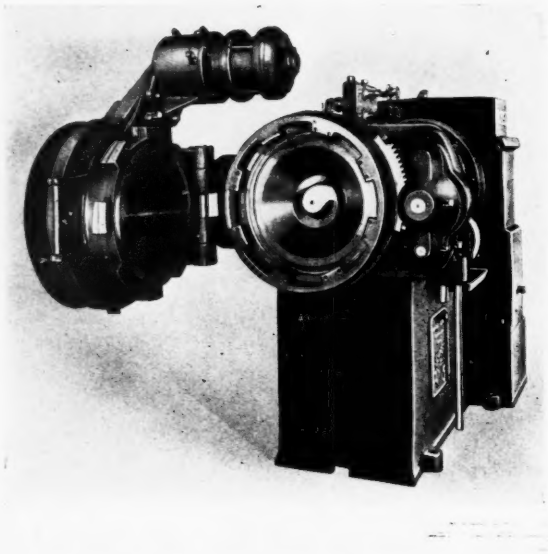

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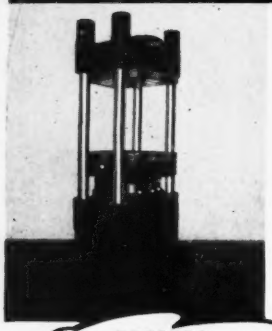

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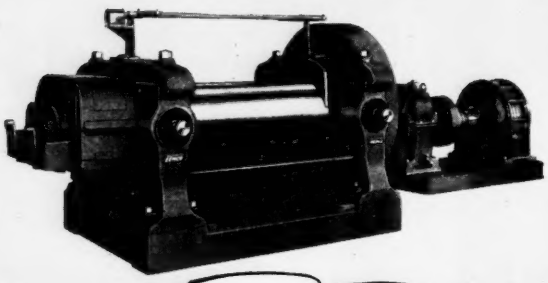

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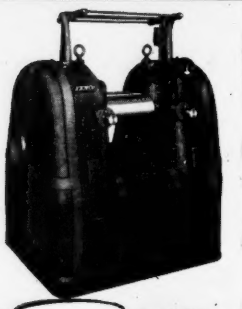

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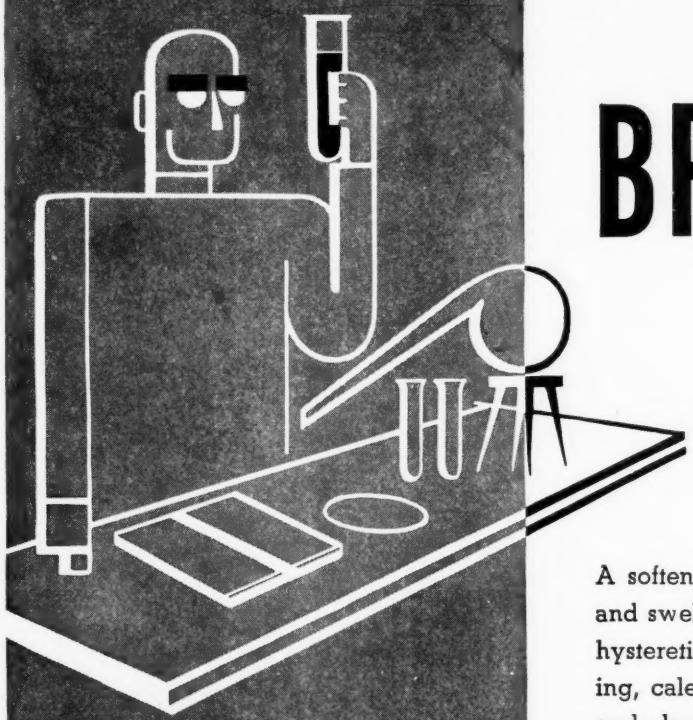

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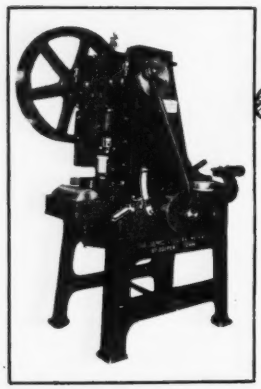

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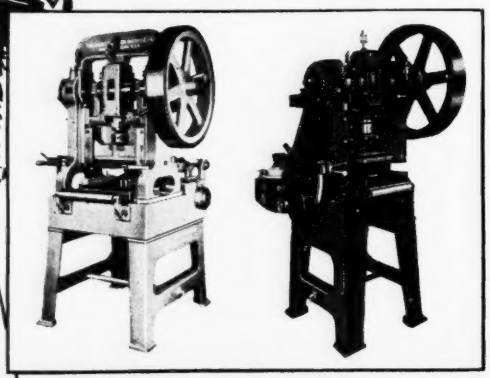

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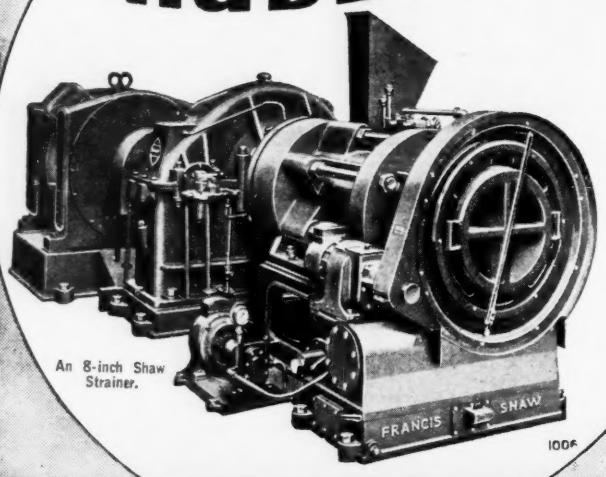

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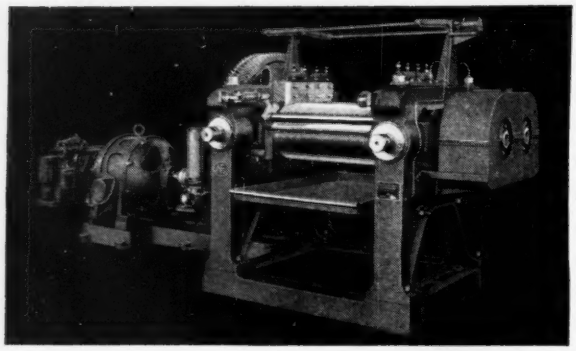

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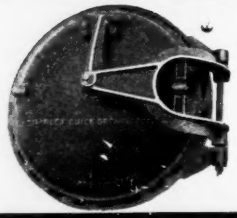

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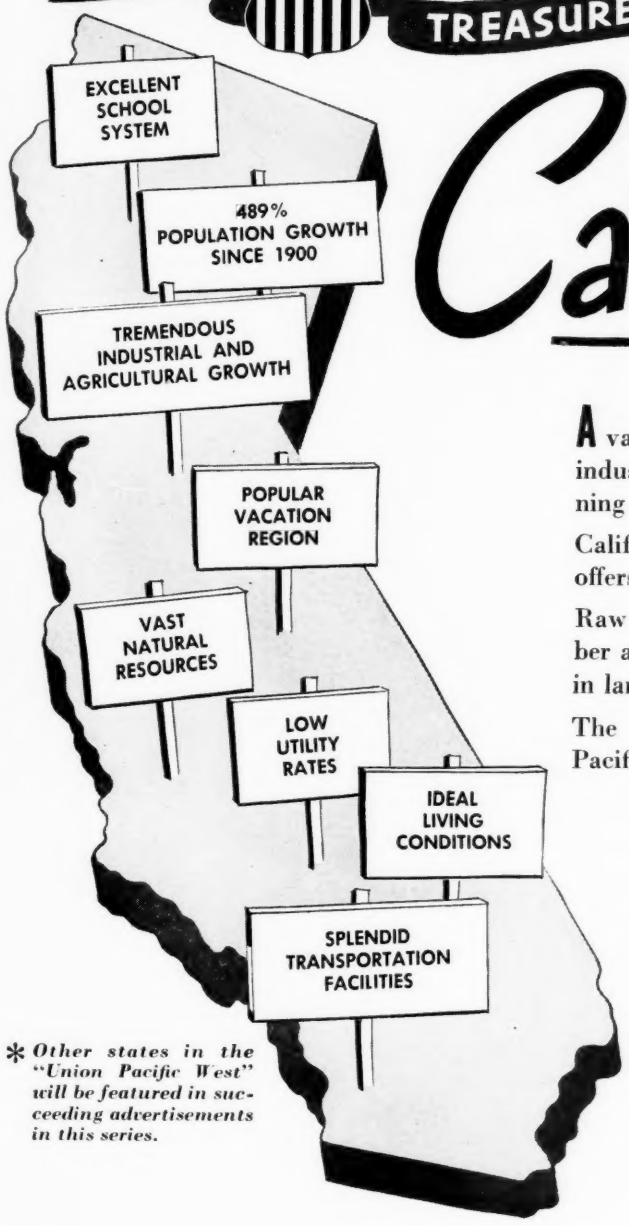

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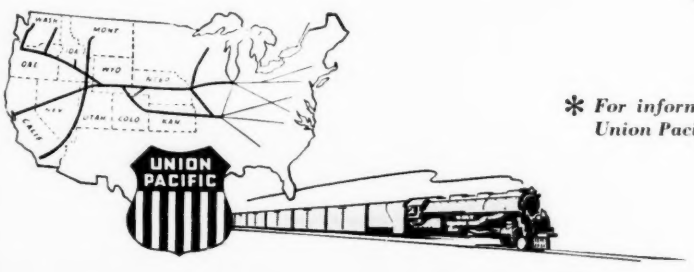

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February, 1947

Volume 115 Number 5

A Bill Brothers Publication

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NATURAL & SYNTHETIC

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INDIA
RUBBER WORLD
NATURAL & SYNTHETIC

Volume 115 | New York, February, 1947 | Number 5

George B. Dryden

A Historical Survey of the Rubber Industry in Chicago[1]

H. A. Winkelmann[2]

CHICAGO has always been the gateway of rubber goods to the West and Middle West. The development of the natural resources of the West, the building of railroads, the expansion of industry and communication, the advent of the bicycle, carriage, tire and automobile, all combined to make Chicago a great rubber consuming area and outlet. The early rubber requirements of Chicago were first met by eastern manufacturers where the first rubber factory was established in Boston in 1833 and in Akron in 1870. There were no rubber factories in Illinois in 1880, but after this date rubber manufacturing was begun to satisfy the growing demands for rubber products. A great deal of credit is due the rubber manufacturers east of Chicago for the foresight and vision which they have always shown in maintaining the finest type of representation in their branches, jobbers, and dealers, which policy has enabled them to serve Chicago with rubber products in such an efficient manner. If this were not true, the rubber goods manufacturing industry in Chicago would be larger than it is today.

Chicago rubber manufacturers have contributed much to the development of the bicycle tire, automobile tire, heels, tank balls, force cups, hoof pads, weather stripping, stick-on soles, printing rolls, sponge rubber, oil seals, hard rubber, continuous vulcanization of insulated wire, and manufacture of reclaimed rubber. The Chicago area manufactures many types of rubber products for industry, transportation, automobile, farm, and home. At present there are approximately 50 manufacturing companies employing 10,000 workmen.

Interesting Developments By Chicagoans

W. H. Salisbury was born in Springfield, Vt., August, 17, 1817, the oldest son of General Moses B. Salisbury, and died in Chicago February 19, 1902. While making some repairs on a woolen mill as a young man in Connecticut, he substituted main driving belts for upright shafting and bevel gears. He was the first man in the United States, and probably in the world, to apply the idea of main belting.

Fred W. Morgan and Rufus Wright in 1883 started to make stamp gum and brought out the double tube bicycle tire in 1891. This purchase led to the development of the Morgan and Wright clincher automobile tire in 1901-1902.

Dykes and Swann, 215 Madison St., applied for a patent in 1895 on rubber soles for leather shoes to prevent slipping. These sold for 35c a pair. This type of sole is still sold in good volume.

D. W. Bosley, 208-210 Washington Blvd., in 1895 patented an all-rubber flexible weatherstrip. It was made in 50-foot lengths and cut to length as required. In 1896 he obtained a patent on and marketed a rubber threshold.

H. S. Firestone operated a selling agency, the Firestone Rubber Co., 367 S. Wabash Ave., to handle the Kelly-Springfield tire. By 1899 the Firestone Rubber Co. was combined with the Rubber Tire Wheel Co.'s Chicago branch. In 1900 Firestone started in business for himself, selling his side-wire carriage tire. In 1903 Firestone made his first tire at the Firestone Tire & Rubber Co., plant in Akron, O.

[1] Presented before the Division of the History of Chemistry, A.C.S., Chicago, Ill., Sept. 10, 1946.
[2] Dryden Rubber Co., Chicago, Ill.

Early Firestone patents were: H. S. Firestone, U. S. patent Nos. 646,274 (1900) and 665,081 (1901).

L. F. Lamplough and E. G. Sturtevant developed continuous vulcanization of insulated wire at Western Electric Co. in 1926-7.

Patents

A survey of the patent literature indicates that Chicagoans have taken a keen interest in the composition, design, development and improvement of rubber products, of all kinds and description. The patentees include names of men who organized a successful business of their own or assumed positions of responsibility with other organizations. A few of these include T. B. Jeffery, F. W. Morgan, Rufus Wright, H. S. Firestone, R. B. Price, G. B. Dryden, C. P. Dryden, C. A. Judsen, and D. C. Blanchard. Gormully & Jeffry Mfg. Co. made the Rambler bicycle for which they had their own G & J tire made by the Indianapolis Rubber Co. and The B. F. Goodrich Co. T. B. Jeffery took out many United States patents on tires and wheel assemblies: Nos. 454,115 (1891), 466,289 and 466,565 (1892), 493,160 and 523,314 (1894), 549,600 and 551,035 (1895), 556,931, 558,956 and 558,957 (1896), 584,115 (1897).

The Rubber Chemist

There was no chemist in the rubber plants of the early days of the industry in Chicago. The superintendent or foreman usually consulted his "black book" when any compounding question arose. While Morgan and Wright were in Chicago, they did not employ a chemist, and any question concerning compounds was handled by Mr. Tobin, compounding foreman.

Raymond B. Price was the first rubber chemist in Chicago, and from 1898 was in or near Chicago during his active years in the rubber industry. He was interested in reclaimed rubber, solid tires, carriage tires, hoofpads, and golf balls. During a trip to Mexico in 1902 he studied the possibilities of growing rubber in Tehuantepec; he was probably the first to investigate the guayule shrub as a source of commercial rubber.

Paul Van Cleef was another of the first rubber chemists in Chicago. He graduated with the M. S. degree in 1905 from the University of Chicago. He was chemist for the Kennecott Water Softening Co. until the Spring of 1906 when he joined Eugene Arnstein, a manufacturer of rubber cements for the shoe, bicycle tire and pneumatic tire industries. When this company failed in the Spring of 1909, Paul Van Cleef went into business for himself and sold cements to many of the former customers of Eugene Arnstein. In 1910, Paul Van Cleef was joined by his brothers, and Van Cleef Bros. was organized. This company has developed many specialties in its field, and by constant research and development has kept pace with new developments.

Rubber Clothing

George H. Laughton, in 1879 organized Laughton & Co., one of the first rubber manufacturing concerns in Chicago. In 1882 this company was incorporated as the Chicago Rubber Clothing Co., and a factory was built at Grand Crossing, outside of Chicago, to manufacture old, suncured Gossamer cloth, formerly purchased in the East. In 1886 the company moved to Racine, Wis., and became a Wisconsin corporation.

Mechanical Rubber Goods

W. H. Salisbury & Co., was founded in 1855 by W. H. Salisbury as independent dealer in rubber and leather products. In 1884 he was joined by his brother M. F. Salisbury. A factory for the manufacture of leather belting was established in 1902, and for molded rubber and extruded products in 1919.

The Chicago Rubber Works began the manufacture of mechanical rubber goods in 1882 at the corner of Randolph and Wells. The four-story building in which operations were carried on is still standing opposite the Bismark Hotel. G. W. Blanchard and L. K. McClymonds organized and owned the Chicago Rubber Works. Blanchard managed the Chicago plant, and McClymonds a plant in Cleveland. R. B. Calcutt, the oldest living active employe of the United States Rubber Co., started to work at the age of 11, just 61 years ago. At 16, Mr. Calcutt was head machinist. A. Korengel, of Germany, was the man who was most familiar with rubber and rubber compounding. Mr. Calcutt states that he learned the "finger nail test" or pinch test for checking the quality of rubber, from Mr. Korengel. Belting, hose, gaskets, packing, stamp gum, truck bands, tubing, washers, etc., were some of the products manufactured. In 1892 this plant became a part of the Mechanical Rubber Co., and manufacturing was carried on at Grand and Rockwell Sts.

Single-tube bicycle tires were made in 1896 under the Tillinghast patents. In 1899 the Mechanical Rubber Co. became a part of the Rubber Goods Mfg. Co., which in turn was absorbed by the United States Rubber Co. in 1907. In 1930, Chicago operations were discontinued.

Pneumatic Tires—Bicycle and Auto

In 1883, Fred Morgan and his father-in-law, Rufus Wright, formed a partnership, to make rubber stamp gum. They hired a basement room on Lake and May Sts. and with about a dozen men started what was destined to become one of the large manufacturing companies of this country. This basement workshop had no windows except in the rear. It was equipped with two steam-heated hand-screw presses. Mr. Morgan had been superintendent at the Chicago Rubber Works and earlier with the Akron Rubber Works. Mr. Wright, born near Cleveland, O., had been an artist in New York and other eastern cities and was 50 years old when he and Morgan started in the rubber business. The history of Morgan & Wright is of interest not only because of their amazing growth, but primarily because they were among the first to develop and pioneer the pneumatic tire.

The original capital was $5,000. The firm perfected the first double-tube bicycle tire in 1891, and the demand for this type of tire grew rapidly as people quickly recognized the advantages of this tire over the solid or cushion tire. The firm incorporated under the laws of Illinois, October 18, 1893, with a capital stock of $100,000, which was increased to $500,000 in January 1898. The stockholders and directors were Mr. and Mrs. Morgan and Mr. Wright. The United States patents on this tire were: F. W. Morgan and Rufus Wright, Nos. 543,093 (1894), 584,289 (1897), 668,384 (1901).

Morgan & Wright enjoyed at least 65% of the bicycle tire business from 1892 to 1897, when bicycle production was at its peak. By 1895 the company was making 20 different styles and weights of tires, and its catalog for that year states, "we had made experiments years before and found that linen was no good in connection with vulcanized rubber." At the 1895 bicycle shows in Chicago and New York, Morgan & Wright tires were mounted on 45% and 35% of the

wheels, respectively. The buildings comprising the Morgan & Wright plant in 1895 located between Lake and Carroll at May St. are as follows: two-story office building, 100 feet by 300 feet; three-story office building, 50 feet by 50 feet; four-story factory building, 50 feet by 125 feet; six-story factory building, 72 feet by 125 feet; one-story cement building, 50 feet by 100 feet, being constructed, six-story factory building, 100 by 125 feet. There were 80 presses for molding outer tubes, giving 8,000 to 9,000 tires per day. The new building mentioned above increased the total number of presses to 200. From October 15, 1895, the number of employes working a 24-hour day, seven days a week, was 1,533.

F. W. Morgan and Wm. Herrick went to London in 1896 for the purpose of finding a buyer for the factory.

The Morgan & Wright catalog for 1897 for the first time featured a single-tube bicycle tire. While still defending the double-tube tire, the company decided to recognize the increasing preference of others for the single-tube tire. The East with good roads and freedom of danger from puncture was partial to the light weight of the single-tube tire. The inner tube was drawn inside the fabric and cemented there in the Morgan & Wright single-tube tire, instead of the whole tire being vulcanized together as under the Tillinghast patents.

In 1899, Morgan & Wright became part of the Rubber Goods Mfg. Co.

Rufus Wright died in his sixty-eighth year in Chicago on April 15, 1900. Mrs. Helen Allen Wright died February 16, 1902. Mrs. Wright was the daughter of Jacob Allen, of Akron, O. Both Mr. and Mrs. Wright are buried in Glendale cemetery, Akron, O.

Morgan & Wright in 1901 brought out a catalog of mechanical rubber goods, which part of the business had been somewhat overshadowed and neglected during the rise in bicycle tire production. From 1901 to 1904, Morgan & Wright made sporting goods, football bladders, and striking bag bladders for A. J. Reach & Co.

In 1901 and 1902 experimental work was concentrated on developing automobile tires. Charles J. Butler became vice president and general manager of Morgan & Wright in 1903, after L. D. Parker's resignation as president. The double-tube bicycle tire proved to be the forerunner of the modern automobile tire. At the 1904, New York auto show the Morgan & Wright clincher automobile tire was shown. In 1904 Morgan & Wright was licensed to manufacturer the new Dunlop detachable tire, and at the 1905 automobile show exhibited both types of tires. Production during this period averaged, 500 tires a day.

Realizing the advantages that would accrue from having a tire plant in Detroit, the center of the automobile industry, it was decided to move the plant there. Building of the new plant was begun August 1905; fires were lighted February 22, 1906, and on August 3, 1906, President Butler and the entire organization was moved by special train to Detroit. The train was met by C. H. Dale, president, Rubber Goods Mfg. Co.

The Rubber Goods Mfg. Co. was merged with the United States Rubber Co. in 1907, according to a merger plan of May 27, 1905.

Williams Bowman Rubber Co. was started in 1903 at Jefferson and Lake Sts., moving to Green St., in 1908 and to its present location in 1915. J. C. Bowman had worked at Morgan & Wright. His company has always specialized in plumbing supplies, force cups, tank balls, etc.

Solid Tires, Carriage Tires, Reclaimed Rubber

Raymond B. Price, who was graduated in 1894 in chemical engineering from Massachusetts Institute of Technology, was engaged by Robert Cowen, Boston Woven Hose & Rubber Co., to install what was probably the first general laboratory in the rubber industry in the United States. Arthur Marks was engaged as assistant to Mr. Price in 1895. In investigating the mystery of "blooming," Price and Marks conducted many experiments which contributed much to the knowledge of reclaiming scrap rubber. Mr. Marks left Boston Woven Hose, in 1897, and Mr. Price left in 1898 when the company went into receivership. Mr. Marks obtained a patent in 1899 on the well-known alkali reclaiming process, and Mr. Price obtained patents in 1902 and 1904 on an alkali process using superheated steam. Mr. Price later installed his process in Chicago and Mishawaka. It is being used today by the Dryden Rubber Co.

After six months with the Peoria Rubber Co., as superintendent, Mr. Price helped organize the Calumet Tire Rubber Co., 44th Street and Waubansia Avenue, in 1898 in Chicago. The Calumet Tire Rubber Co. manufactured carriage tires, solid tires, and hoof pads. Many of the products manufactured were as a result of patents issued to Mr. Price. Eight thousand to 10,000 pounds of pan reclaim were made a day for the firm's own use.

In 1908, Mr. Price organized the Rubber Regenerating Co., with the assistance of F. A. Saunders, and F. G., E. G., and James Eberhardt, and started to build a plant in Mishawaka. Mr. Price owned one-half of the plant. The steel ball or sphere used in reclaming was made by John Mohr, Chicago.

The buildings and part of the machinery of the Calumet Tire Rubber Co. was sold in 1909. Mr. Price and E. A. Anderson, superintendent, then moved to Mishawaka. Mr. Price maintained a control as well as research laboratory and in 1911 engaged C. E. Bradley for research work. Mr. Price instituted the idea of technical sales service, so common today, but an innovation at that date, whereby he would undertake to show in the laboratory or factory how his reclaims could be used to best advantage. In 1913 Mr. Price sold the Rubber Regenerating Co. to the United States Rubber Co.

Some of the United States patents granted Mr. Price were: R. B. Price 657,787 and 657,832 (1900), 686,905 and 690,604 (1901), 693,151 (1902), 752,414-417, 762,843, and 768,237 (1904), 1,166,784 and 1,209,643 (1916), and F. W. Kinney and R. B. Price 692,597 (1902). English patents granted Mr. Price follow: 14,544 and 14,545 (1900), 3,468 and 23,436 (1901), 444 and 3,468 (1902), 8,311 (1903), 17,313 (1904); French patent Nos. 318,580 (1902) and 345,793 (1904); German patent No. 193,295 (1903).

Rubber Horseshoe Pads and Rubber Filled Horseshoes

The city of Chicago, with its large use of horses, became around 1900 one of the best markets for rubber horse shoes and hoof pads in the world. It is estimated that horses lose 60% of their energy when walking without hoof pads on pavements. After an exhaustive series of tests Marshall Field in 1903 reported that horses shod with rubber gave six years of service instead of three. Some horses even refused hard pavement without rubber shoes. It was therefore a logical development for men identified with the carriage and horseshoeing trade to design a hoof pad and have it manufactured for them and subsequently engage in manufacture of the hoof pads themselves.

The dean of the rubber industry, in Chicago, George B. Dryden, of Dryden Rubber Co., started in February 1897 as a salesman of carriage tires and solid tires for

Kelly, Maus & Co. In 1898, Mr. Dryden and H. S. Firestone, Sr., formed the Imperial Rubber Tire Co., taking over the business of Kelly, Maus & Co., at 447 Wabash Ave. Mr. Dryden was secretary-treasurer of the company until it was acquired in 1900 by the Rubber Tire Wheel Co., which he then represented as Chicago manager. The Rubber Tire Wheel Co. became the Kelly-Springfield Tire Co., and later the Consolidated Rubber Tire Co., with Mr. Dryden as manager. In 1901 he organized the Dryden Rubber Tire Co. On August 19, 1901, the Dryden Hoof Pad Co. was formed as a selling organization at 433 Wabash Ave., and the patented Dryden four-ply canvas back, open-type, and Buckeye closed-type hoof pads were offered for sale. One of the slogans in 1901 was "Spare the hoof and save the horse." On October 7, 1909, the Dryden Hoof Pad Co. started manufacturing operations at 12th St. and 46th Ave. with nine employes. The Peerless Rubber Horseshoe Co. was organized in 1912. The present plant location of the Dryden Rubber Co., 1014 S. Kildare Ave., was acquired in 1912, and the factory was moved that same year. In 1914 the name was changed from the Dryden Hoof Pad Co. to the Dryden Rubber Co.

Dryden Rubber Co. has furnished the automotive industry all types of dense and sponge rubber parts since 1912. In 1913 it furnished Cadillac Motor Co. with the first non-blooming windshield rubber. Patents issued to G. B. Dryden and his brother, C. P. Dryden include: United States patent Nos. 30,417 (design) (1899), G. B. Dryden; 681,411 (1901), C. P. Dryden; 724,681 and 739,658 (1903), 788,824 and 793,998 (1905), all by G. B. Dryden; 1,154,005 (1915), G. C. Reeves; 1,156,278 (1915), C. P. Dryden. English patent No. 24,758 was taken out by G. B. Dryden in 1902, in which year he also took out French patent No. 326,256.

Robert E. Fruin and Thomas Tobin started marketing rubber-filled horseshoes about 1912, manfactured by the Dryden Rubber Co. Mr. Fruin began manufacturing his own rubber horseshoes and hoof pads in 1916.

C. A. Judsen became identified with the horseshoing trade in 1891. He later had his hoof pads made for him by various rubber manufacturers. In 1922 he began his own manufacturing operations at 4701 W. Kinzie St. and is now making a miscellaneous line of molded goods. At 80 years of age Mr. Judsen is still active in the business and believes that work is the only thing that brings happiness and contentment, and when you talk with him, you know he has both. The Judsen patent is United States patent No. 707,594 (1902).

F. S. Frost in 1899 represented the Diamond Rubber Co. in Chicago as a salesman on carriage tires and bicycle tires. About 1910 he developed and sold a line of hoof pads. In 1924 he started his own manufacturing operations at Jefferson and Washington, and moved to his present location at 1415 N. Dayton St. in 1930. The company, Frost Rubber Works, manufactures molded goods and sponge rubber products.

Automobile Tires

Vail Rubber Works was organized January, 1910, by Wm. A. Vail to manufacture molded rubber goods such as heels, valves, and gaskets. On October 26 it was incorporated as the Vail Rubber Co. At the Fifteenth National Automobile Show in New York, January 2 to 9, 1915, a general-line of auto tire accessories was exhibited. These included Dykes Ever-Stick-Reliners, a molded four-ply reliner, and Dykes Never-Creep double-lock and lace-on outer boots, etc. November 2, 1916, the name was changed to Ehman Tire & Rubber Co. A. C. Ehman in 1917 announced that 300 tires were being produced daily, and by March, 1918, production was expected to reach 3,000 tires and tubes per day. In 1918 this company was taken over by the Inland Rubber Co., which in turn became a division of the Minnesota Mining & Mfg. Co. in 1941. Inland Rubber Corp. is producing 3,000 tires per day and is the only company in Chicago engaged in tire manufacture. This company is a part of the National Synthetic Rubber Corp., Louisville, Ky., which operates a copolymer plant for the preparation of GR-S. There are no other Chicago companies manufacturing synthetic rubber.

The Century Rubber Co. was organized in 1912 by Joseph and Frank Netzel at Huron St. near Wells to manufacture automobile tires, soles and heels. It was incorporated for $30,000 in 1913. The company was purchased in 1916 by Charles T. and Henry Venn. Inner tubes, hoof pads and Goodall packings were added. The firm also made some reclaimed rubber for its own consumption.

Stamp Gum

Chicago and New York have for many years been the centers of the rubber stamp and stencil trade. In 1895 the stamp gum business in the United States amounted to about $500,000, and by 1903 this figure had grown to $6,000,000 per year. In 1903 there were about 300 companies making stamp gum, and of these, 50 were classed as large companies. The rubber compounds were purchased from rubber manufacturers.

C. H. Hanson started in business in Chicago in 1865 for the purpose of making rubber stamps and stencils. The C. H. Hanson Co. was incorporated in 1897 by C. H. Hanson, E. C. Band and G. W. Schroeder to continue the manufacture of rubber stamps and stencil goods.

The Superior Rubber Type Co., which later became the Superior Type Co. and is now called the Superior Marking Equipment Co., in 1902 shipped the first complete steam vulcanizing unit to Honolulu for manufacture and curing of rubber stamps. In 1914 this company issued a booklet on "Rubber Stamp Making."

Printer's Rolls

Through the efforts of Sam'l Bingham's Son Mfg. Co., Rapid Roller Co., and Ideal Roller & Mfg. Co., Chicago has for many years been a leader in the manufacture of rubber supplies for printers, including rolls of all kinds, printer's blankets, cutting rubbers, unvulcanized rubber for printing plates, etc. Synthetic rubbers, such as neoprene and the nitrile types, have greatly increased the outlet for rubber by replacing gelatin and vulcanized oil compositions.

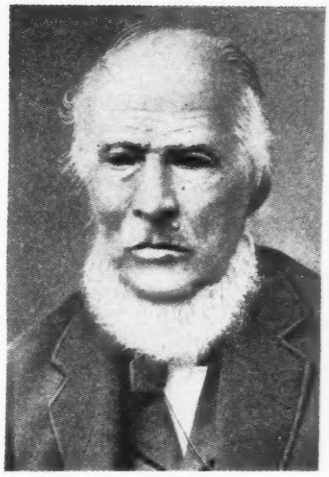
Samuel Bingham is credited with the establishment of the business of manufacturing printing rollers for the trade. He was born in Hanover, N. H., on October 25, 1790, a year that witnessed the outbreak of the first French revolution. While he was but a child, his mother was left a widow, who, to support the family, kept a boarding house for the students of Dartmouth College. Among the many who boarded there was the afterward celebrated Daniel Webster. Being left an orphan soon afterward, and without a relative in the world, Samuel Bingham was in the year 1800 bound apprentice by the orphans' court to learn the printing business. He went to Harper Brothers in 1840 and after many changes embarked in the roller-making busi-

Sam'l Bingham's Son Mfg. Co.

Millard F. Bingham

United States Rubber Co.

Raymond B. Price



Sam'l Bingham's Son Mfg. Co.

Samuel Bingham

ness in 1847. His first place of business was in New York, N. Y., on William St., from which he moved in 1850 to No. 5 Spruce St., under the shadow of the old Tribune Building. In 1857 he removed to 27 Beekman St., occupied by Conner's type-foundry, which was totally destroyed by a disastrous conflagration in 1862. Nothing daunted, Mr. Bingham commenced again near the old stand, at 13 Spruce St. Here he remained until old age compelled his retirement. He died May 7, 1876, at the age of 86, leaving a large family of sons and daughters.

After his retirement his sons, Leander K. and W. H., removed the business in 1871 to No. 31 Rose St., and by their enterprise revolutionized and expanded the business beyond their most sanguine expectations. Two years later they again changed to the first floor, Nos. 49 and 51 Rose St., in the fireproof building of George Monroe. In 1901 they moved to 406 Pearl St., where they are still operating under the name of Bingham Bros. Co., with branches in Philadelphia, Baltimore, and Rochester.

Leander K. Bingham, who succeeded his father when that old veteran retired, had associated with him two of his brothers, William H. and Millard F. Millard F. Bingham, the youngest son of old Samuel Bingham, ambitious to establish his own business, left his brother Leander's business in 1877 and went to Chicago, where he started in a small way at 147 Fifth Ave., now Wells St., under the name of Sam'l Bingham's Son Mfg. Co. He is credited with the substitution of glycerine for treacle or molasses in the compounding of roller composition and also, of tremendous importance, the invention of the roller casting machine by means of which the old-time method was superseded by machinery, producing better rollers, more accurate, more uniform in composition, and producing them more rapidly and efficiently. He also established plants in cities of strategic importance, as he called them, printing centers which were also railroad centers—at various points which would serve the printers in the towns in which the plants were located and within a radius of 200, 300, miles there-from.

With the introduction of high-speed presses and new types of ink, something more durable than the composition roller was demanded, and Millard F. Bingham, having in mind the earlier attempts to use rubber, came to the conclusion that new methods of compounding rubber and rubber rollers might be feasible. In 1927 the Sam'l Bingham's Son Mfg. Co., began the manufacture of rubber rollers on an experimental basis. In due course its methods and technique improved, and the company is now the largest producer of either natural or synthetic rubber rollers in the country today, if not in the world.

Millard F. Bingham had experimented with vulcanized oil for letter press work in 1900, but found many deficiencies in that roller for that purpose.

With the growth of offset printing, and since composition rollers could not be used because of the water used in the offset process, he again reverted to his old-time experiments and began to develop and improve the vulcanized oil roller which he had abandoned years before, and with that development the business of manufacturing vulcanized oil rollers for offset presses and for some particular uses on letter presses attained large proportions.

Millard Bingham had three sons, Millard F. Bingham Jr., the oldest, Carl G. Bingham, and Samuel A. Bingham, the third, who in due course, entered the roller business. Samuel A. Bingham retired from active participation in the business about 1927 owing to ill health; and Millard F. Bingham, Jr., disposed of his interest in the business in 1935, leaving the second son, Carl G. Bingham, in charge of the business, where he had been active since 1902. Carl G. Bingham, Jr., the oldest son of Carl G. Bingham, the president, is now actively engaged in the business, which means the fourth generation of one family is aiding in the conducting of the business established 99 years ago; and another son, John, it is expected will enter the business in a few years. Few concerns can boast of four generations conducting a business, and at the same time, so successfully.

In 1917 the Ideal Roller & Mfg. Co. was organized and started to manufacture a vulcanized oil product by reacting drying oils and semi-drying oils with sulphur chloride. A very unique product was developed to replace the hand-covered leather rollers which were used prior to this time as inking rollers on lithographic and offset presses. By 1921, Ideal vulcanized oil rollers had replaced many of the leather lithographic rollers throughout the world. Their soft, uniform texture eliminated excessive wear on the delicate lithographic plates, and their natural affinity for lithographic varnishes played

a large role in the tremendous strides made in lithography during the early twenties. Vulcanized oil rollers are still being used where high-quality lithography is essential.

In 1924, working in cooperation with A. B. Davis, of the Crowell-Collier Publishing Co., a typographic roller was developed and perfected for use on high-speed magazine, carton, and food-wrapper presses. This roll was known as the Ideal process roll and consisted of a soft base over which a thin, renewable gelatine surface could be applied by the printer. The process roller gave the printer high-quality printing at a much reduced cost. It eliminated the necessity of returning a wornout roller to the roller maker for rebuilding. The printer was able to apply a new gelatine surface to the base roller by means of an automatic coating machine which is manufactured by Ideal Roller & Mfg. Co. The old surface, when cracked or worn out, can be removed by washing with hot water. A thin gelatine coating is applied, about 1/32-inch in thickness and may be sectioned with a special sectioning machine, manufactured by Ideal, for split-fountain printing.

The early developments in base rollers for the process system consisted of vulcanized oil core with a thin rubber sleeve over the vulcanized oil core. Rubber equipment was first installed at the Chicago plant of Ideal in 1932, and shortly thereafter exceedingly soft rubber compounds were developed which are now used entirely for process base rollers.

With the development of DuPrene synthetic rubber, as it was called in 1934, Ideal Roller developed the first all-synthetic rubber printing rollers. These synthetic rubber rollers, owing to their high oil resistance, are used in printing newspapers where high-quality work is desirable. Since 1934, Ideal has concentrated on the development of rollers made from neoprene and nitrile-type rubbers.

In addition to printing rollers, Ideal also supplies cutting rubbers to the newspaper printers. Suction cups are also made for all types of paper feeders. Unvulcanized rubber is furnished to printers and plate-makers; they vulcanize this rubber into rubber printing plates, which replace all types of metal plates in the typographic field, and this development has been responsible for the tremendous strides made in the aniline ink printing process.

Ideal has also developed many synthetic rubber items such as oil seals, hydraulic accumulator separators, and valve diaphragms. Ideal Roller & Mfg. Co. developed the first successful all-synthetic milking inflation which, owing to its extreme resistance to lactic acid and butterfat, will eliminate the necessity of natural rubber for milking inflations.

The Rapid Roller Co. started to manufacture rubber covered printing rolls in 1928 and offset printer's blankets in 1933. It is the only Chicago company making printer's blankets. During the war, proofed fabrics for balloons and life rafts were a major part of its business.

Oil Seals

With the introduction of synthetic rubber, three well-established companies became interested in the manufacture of synthetic rubber oil seals. They are Victor Mfg. & Gasket Co., Chicago Rawhide Co., and Chicago Belting Co.

Cements, Rubber and Adhesive Tape, Pressure-Sensitive Tape

The Western Rubber & Belting Co. in 1892 reported that its factory was busy making insulating tape, grip rubber and belting.

The use of rubber in the production of surgical adhesive plaster in Chicago was started about 1895 by the Heineman Co., which later became Bauer & Black. In producing medicated plaster and tape, no vulcanizing agents are used. The rubber is compounded with fillers, resins, and plasticizers and calendered on to a cloth backing.

While spreading operations are possible and are used for industrial pressure-sensitive tapes, practically all surgical tape is made by calendering techniques. The well-equipped adhesive plant utilizes much of the common rubber equipment.

Today many millions of yards of surgical plaster and many more millions of yards of industrial adhesive plaster are turned out yearly in the Chicago area. Practically all of these products in normal times utilize rubber in some form as the elastomer base.

Eugene Arnstein, a manufacturer of rubber cement, moved in 1902 from 86 Lake St., to a new factory at 35th and Shields St. He exhibited at the auto show in February, 1907, in the Coliseum. Stocks of cements were maintained in all of the principal cities. Paul Van Cleef worked with Mr. Arnstein from 1906 to 1909.

Van Cleef Bros. began manufacturing rubber cements on January 1, 1910 at 77th and Woodlawn Ave. The capacity of the plant was doubled in 1913 and has continued to expand with the addition of new products. Originally the rubber cement was made for the shoe trade. Later the cement was packaged in tubes, bottles, or cans for the bicycle and automotive trade. Electrical, friction and pressure-sensitive tapes were developed to meet industry's requirements and increase the scope of the business. Noah, Maxime, and Paul organized the company and were later joined by their brother Felix. All but Maxime are still active in the business. Other products which are manufactured include molded goods, rubberized fabrics, inner tube and tire patches, molded and sheet sponge rubber.

United States patents assigned to Van Cleef Bros. follow:

1,656,404, 1,913,526, 1,985,356, 1,994,759, 1,994,776, 1,994,790, 2,025,917, 2,025,918, 2,038,325, 2,051,504, 2,061,817, 2,079,826, 2,084,878, 2,087,489, 2,088,129, 2,101,355, 2,115,254, 2,162,332, 2,229,316, 2,229,317, 2,248,317, 2,248,318, 2,253,922, 2,266,527, 2,270,944, 2,270,945, 2,290,223, 2,313,379, 2,326,581, 2,339,131, 2,368,190, 2,385,055, 2,393,843.

Sponge Rubber

The Chicago Tire & Rubber Co. was organized in 1902 by John L. G. Dykes, with a two-story factory building at 329-331 West Kinzie St.. In 1903 this company announced that it was the first in the United States to make rubber sponge.

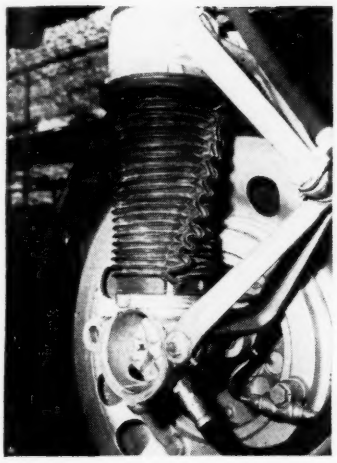
The N Tire Rubber Sponge Co., 354 E. Indiana St., in 1908 was manufacturing Featheredge rubber sponges for railroad and vehicle cleaning. In March 1911, B. B. Felix took over the business of the N. Tire Rubber Sponge Co. and formed the Featheredge Rubber Co., which continued to make sponge rubber, particularly automotive, until 1942.

Dryden Rubber Co. has for many years manufactured automotive and industrial sponge rubber. Frost Rubber Works, Airlastic Rubber Co., and Peerless Rubber Co. also specialize in sponge rubber products.

Hard Rubber

Western Electric Co., the largest manufacturer of electrical communication equipment in the country, in 1905 equipped a department to manufacture hard rubber prod-

(Continued on page 669)



Rubber Dust Boot and Tire on Landing Gear of Latest Douglas Attack Bomber

West Coast Mechanical Rubber Goods Industry

Tom Cameron

Fishing Boats Have Taken to Navy Principle of Rubber Propeller Drive Shaft Covering. New Tuna Clipper Shaft Is Here Being Covered

SUPPORTED by the wartime-developed $73,000,000 system of closely integrated synthetic rubber plants concentrated in the Los Angeles, Calif., area and assured of adequate supplies of raw materials, the Pacific Coast mechanical rubber goods industry is expanding rapidly into new fields which promise not only West Coast, but Far Eastern and even global markets.

Detailed description of the six plants, whose operations are tied together in a continuous production flow by a vast system of underground pipelines involving the nearby petroleum production fields and the Southern California Gas Co.'s butadiene plant in downtown Los Angeles, as well as the other units, appeared in the June, 1944, issue of India RUBBER WORLD.

Eighty-three (at latest count) manufacturers and processors, practically all of them geared to use synthetic rather than natural rubber, have sprung up, developed, and expanded new ideas for rubber. Additional concerns, according to the industrial department of the Los Angeles Chamber of Commerce, await only the opportunity to construct factories to launch still other enterprises in the mechanical rubber goods field.

Already these products are bewilderingly diverse. They range from those huge "rubber highways" which carry thousands of tons of materials on endless conveyer belts to such oddities as a cauliflower ear for a movie character, from mechanical berry pickers to novelty items guaranteed to set Junior's pulse jumping on Hallowe'en.

While not all of the mechanical goods manufacturers are found anxious to describe their newest projects and production items until they have hit the market ahead of their competitors, the list of different articles already being produced has passed the 20,000-mark, according to a recent estimate.

The Pacific Coast's steadily expanding automobile and truck building and assembly industry, with an output of 650,000 units scheduled by mid-1947 in comparison with the 1941 production of 154,000 vehicles, furnishes a challenge to the Western rubber industry which is being gladly accepted. The four major tire companies—United States Rubber Co., Goodyear Tire & Rubber Co., The B. F. Goodrich Co., and Firestone Tire & Rubber Co.—have instituted major expansion programs to keep pace with the regional demand for tires.

However, since cars and trucks require rubber in many places besides the wheels, the mechanical goods producers have been quick to offer their facilities for such diverse items as Airfoam cushions, radiator hose, noise-eliminating linings, and other accessories. The automotive industry, which is scheduled to supply the bulk of the cars and trucks required by the steadily growing Pacific Coast population, alone may be depended upon to keep many rubber processors busy.

Some New Developments

But it is in new and hitherto untried fields where the rubber manufacturers are achieving renown in domestic and foreign markets.

One of these is development of a rubber-to-steel bonding technique first utilized in the Pasco, Wash., atomic bomb project. This also is being used by the California Steel Products Co., which is building acid tanks for the International Steel & Chemical Co. plant at San Jose, Calif. The United States Rubber Co. lines these tanks with rubber which resists chemical action. Similar work has been done for the Dow Chemical Co. plant in Oakland. The Commercial Sandblast Co. also has been associated with this project.

During the war the Navy discovered that propeller drive shafts covered with rubber wrappings gave better service than those unprotected. Now the huge and growing tuna clipper and purse seiner fleets off the California coast are adopting the system, with builders specifying rubber shaft-linings.

Somewhat different is the output of Rubbercraft, a Los Angeles manufacturer. Rubbercraft is now in a position to fill orders for such widely contrasted items as garden hose, rubber sink pans, Airfoam mattresses, air cushions, and laboratory, technical, and hospital items.

For the motion picture industry this company is prepared to turn out rubber guns, swords, daggers, masks for horror and other film characters, fake crocodiles, hand cuffs, clubs, rubber chains, false teeth and phony barbed-wire fencing. For the area's tremendous oil-tool industry Rubbercraft's specialties include an 840-pound oil-well blowout preventer.

Standard Rubber, a war-born concern less than two years old, is working against a heavy backlog of orders, which is increasing all the time. Standard's latest order was one for three million electric plugs. Other products emerging in large quantity include toy balloons, scooter tires, plumbing parts, and hundreds of extruded and molded items. The company at latest report was using more than 2,500 pounds of GR-S, neoprene, and nitrile-type rubbers daily.

One Pacific Coast company has reversed the traditional

pattern of expansion from east to west. Kirkhill, Inc., which was born in Los Angeles, now has branches in Philadelphia, Chicago, and Dallas. Twenty thousand different items are on the current production schedule. Kirkhill's most important products, however, are plumbing supplies and special orders for restaurant and hotel fixture manufacturers.

To these ambitious Pacific Coast manufacturers nothing is too new or impossible. They see in the prospective industrial development of the Far East tremendous potential markets for the products of their drawing boards and their factories. The Japanese have been out of the novelty and specialty market since Pearl Harbor and may not become an important competitor for years, if ever. The Pacific Coast manufacturers are going after this and other foreign markets.

E. W. Seckendorff

Booming Construction in Pacfiic Coast States Boosts Demand for Conveyer Belting. Mountains of Material Move on "Rubber Highways" Such as Shown Here in Use at Consolidated Rock & Gravel Co. Quarries in Roscoe, Calif.

And reality supports their global outlook in many instances. Rubbercraft, for instance, has found a fertile field for its products in the oil fields of far-off Arabia.

In the novelty field, whimsicality is paying off. Some of it has an unmistakable Hollywood touch. The sprawling studios themselves furnish outlets—some of them of surprising nature—for the enterprising rubber goods manufacturers.

Cecil B. De Mille's motion picture epic, "Reap the Wild Wind," furnishes an authentic example of what some of the rubber men are called upon to do. Bart Thompson, of Los Angeles, was informed that the script called for an octopus with tentacles 40 feet in length and made of rubber so that they could be manipulated realistically. When Thompson discussed his problem with the more conventional members of the rubber goods fraternity, he was told no man in his right mind would tackle the job. One of them estimated that the molds alone would cost several million dollars.

Thompson said sadly, "Well, that's the difference between you and me. You can't do it, but I've got to."

He solved the problem—and evolved a new technique for the industry—by building tunnels to cover each of the 40-foot tentacles. Then he shot steam into them to cure the foam rubber. He was, perhaps, like the bee which, not knowing anything of the theory of aerodynamics, flew anyway.

Many of the rubber products being turned out on the Coast were undreamed of elsewhere, but quickly

Stan Spiegle Photo

Mr. Andersen and Wife Demonstrate New Cranberry Picker in Their Grayland, Wash., Fields

promise to become popular. One is an all-synthetic air-inflated paddleboard with built-in diving mask. Users merely need to put their face down against the mask to enjoy the same submarine wonders that have long intrigued passengers on the famed Catalina Island glass-bottomed boats.

More practical and prosaic, perhaps, was the case of a Swedish cranberry grower in the Grayland, Wash., area. Picking cranberries is a laborious process. Grower Andersen required 50 pickers to go over his three acres of cranberries which, in a normal year, produced about 800 boxes of the fruit.

In 1945 there were no pickers to be had. Andersen went out to his cranberry patch, literally scratching his head for inspiration on how to save his crop. He wondered if it might be possible to pick cranberries by the vacuum cleaner principle. He took his problem and his idea to the Seattle branch of the United States Rubber Co. and to various other design engineers. They developed a hose lined with abrasive-resistant rubber, as well as supplying the sponge rubber with which to line the fruit hopper.

The mechanical picker worked. Andersen picked his crop with four assistants instead of 50, and the yield increased to 800 boxes—per acre! The idea promises to revolutionize methods of picking not only cranberries, but some other fruits throughout the country. And it adds a new potential to the rubber industry's markets.

Similarly, with less drama and more conscious design, the young, imaginative aircraft engineers are doing things with rubber that had never been thought of before by the traditionally minded rubber engineer.

Aircraft industry engineers, seeking a short-cut to the mass production of metal parts and spurred by the urgency of the climactic war years, suggested the idea of rubber female dies for the hydraulic presses. Against the studied advice of rubber men, they went ahead and designed such rubber dies.

As a result, the fabrication of many airplane parts and accessories changed from a hand-tailored process to an assembly line movement that contributed vitally to the aircraft industry's achievement of the then incredible production goals flung at them by the late President.

Summary and Conclusions

The Pacific Coast industry's pioneering spirit and

(*Continued on page* 658)

The Effect of Oxidation on the Plasticity and Solubility of GR-S[1]

R. D. Juve[2]

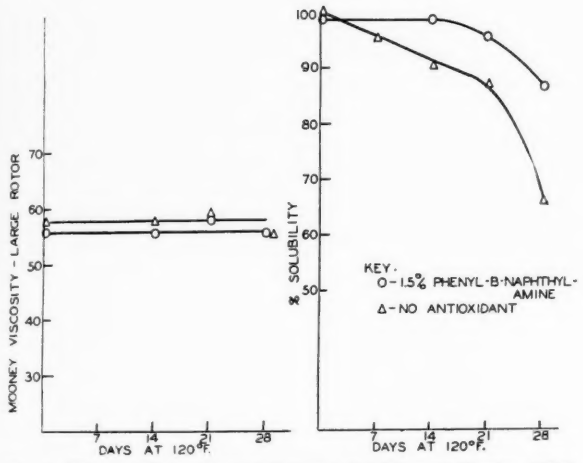


Fig. 1. Effect on Plasticity and Benzene Solubility of Heating GR-S in Air at 120° F.

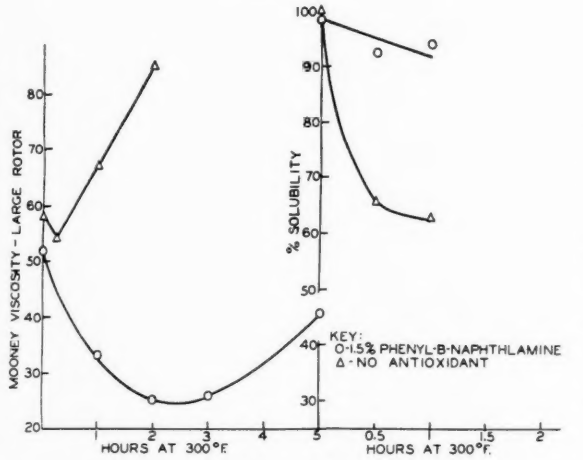


Fig. 3. Effect on Plasticity and Benzene Solubility of Heating GR-S in Air at 300° F.

TOBOLSKY[3] and others have been of the opinion that the autooxidation of synthetic rubbers causes two effects to occur: namely, chain scission and cross-linking. Chain scission results in a reduced Mooney viscosity in GR-S; whereas cross-linking results in a gradual toughening which ultimately proceeds to a brittle, resinified condition. The relative rates of these two actions in GR-S depend, among other things, upon temperature and the amount of oxygen[4] present. By the selection of desirable conditions, the Germans employed a thermal treatment in air to soften the tough Buna S prior to factory processing.[5] GR-S, likewise, can be softened by heating in the presence of air.

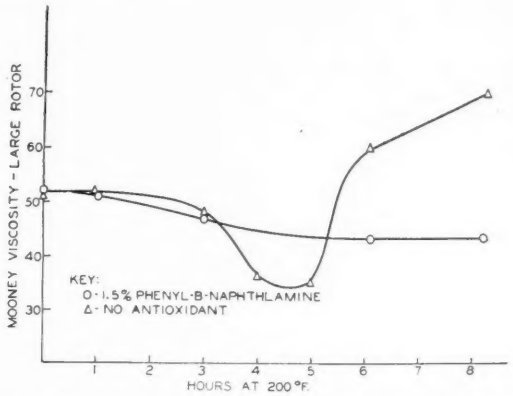


Fig. 2. Effect on Plasticity of Heating GR-S in Air at 200° F.

A study of the changes in the benzene solubility, intrinsic viscosity of the soluble portion, and oxygen uptake of uncured GR-S, *Hevea*, and other polymers during aging has been reported by Cole and Field.[6]

The data reported herein describe the net effect of oxidation on the Mooney viscosity of GR-S under different times of exposure to air at three temperatures and during exposure to visible light.

Oven Heating

When raw GR-S containing 1.5% phenyl-beta-naphthylamine was exposed to air at 120° F., no change in the Mooney viscosity occurred during 28 days, as is shown on Figure 1. The benzene solubility of the polymer, however, began to fall off noticeably after 14 days. A sample of the same GR-S from which the phenyl-beta-naphthylamine had been omitted showed no change in Mooney viscosity during 21 days at the same temperature. The Mooney value at 28 days was slightly lower, but the difference is believed to be within the range of experimental error. A marked difference was observed, however, between the solubility behavior of the antioxidant-containing and the antioxidant-free GR-S. Gel started to form in the antioxidant-free sample soon after it was placed into the 120° F. oven, and the amount of gel increased throughout the aging period.

At 200° F. the Mooney viscosity of GR-S with normal phenyl-beta-naphthylamine as antioxidant had dropped only slightly after eight hours. The viscosity of the same polymer from which antioxidant had been omitted reached a minimum after approximately four or five hours at 200° F., then increased rapidly on further heating. These data are plotted on Figure 2.

From Figure 3 it can be seen that at 300° F, the effect of the antioxidant on the softening and subsequent res-

[1] The work reported here was done in connection with the Government Research Program on Synthetic Rubber under contract with the Office of Rubber Reserve, Reconstruction Finance Corp. Contribution No. 137 from the Goodyear Tire & Rubber Co. Research Laboratory.
[2] Research laboratory, Goodyear Tire & Rubber Co., Akron, O.
[3] Tobolsky, Prettyman, and Dillon, *J. App. Physics*, 15, 380-95 (1944).
[4] White, Ebers, Shriver, and Breck, *Ind. Eng. Chem.*, 37, 770 (1945).
[5] H. Hagen, India RUBBER WORLD, 108, 45-51 (1943).
St. Reiner, *Kautschuk*, 16, 138-40 (1940).
[6] J. O. Cole and J. E. Field, *Ind. Eng. Chem.* (in print).

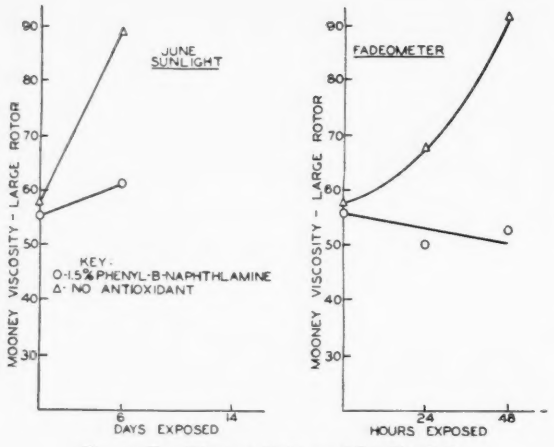


Fig. 4. The Effect of Light on GR-S Plasticity

inification was much more noticeable than it was at either 120° or 200° F. The sample with 1.5% phenyl-beta-naphthylamine apparently reached a minimum Mooney viscosity at between two and three hours' heating. After the third hour's heating it began to resinify. The absence of antioxidant allowed the polymer to resinify very rapidly, although it softened slightly during the first 15 minutes' heating. The benzene solubility data also reflect the difference in behavior.

Exposure to Light

The effect of June sunlight on the Mooney viscosity of GR-S is shown in Figure 4. After six days' exposure the raw GR-S copolymer without antioxidant had become badly embrittled. The presence of the 1.5% phenyl-beta-naphthylamine retarded the embrittlement markedly. Also on Figure 4 it is shown that phenyl-beta-naphthylamine protected the polymer during Fadeometer aging. After 48 hours in the Fadeometer the Mooney viscosity of raw GR-S without antioxidant had reached an embrittled state similar to that reached in six days' exposure to June sunlight. The sample exposed to natural and accelerated light aging were much more affected on the surface than in the interior of the specimens.

Experimental Procedure

An experimental batch of GR-S latex, shortstopped, but containing no antioxidant was divided into two portions after it had been stripped of unreacted monomers. One portion was coagulated without addition of antioxidant; whereas 1.5% phenyl-beta-naphthylamine was added to the other portion prior to coagulation. The same method of coagulation with salt plus sulfuric acid was used for both of the splits. After waterwashing, the coagulated polymer was dried in a circulating air oven under standard GR-S conditions.

To insure homogeneity of the polymer and to disperse the antioxidant, the dried crumb was given four passes through a cold mill at 1/4-inch gage and was then sheeted out thin. The sheet polymer was cut into strips approximately 1/8-inch square and was placed on aluminum foil to be put into a circulating air oven for various periods of aging. After heating, each sample was homogenized by four passes through a cold mill set at 1/4-inch gage. Mooney viscosity and benzene solubility were determined on the mill massed samples.

The samples exposed to direct sunlight and to the Fadeometer were prepared by giving the coagulated crumb six passes through a cold mill at 1/4-inch gage. One set of samples was placed on the roof for exposure to direct sunlight during the month of June. The other set of samples was placed in the Fadeometer manufactured by Atlas Electric Devices. All of the samples were examined for surface embrittlement and elasticity before determining Mooney viscosity.

Discussion of Results

Inaccuracies in heat-softening studies arise from variations in amount of surface exposed during heating and other variables in the thermal treatment as well as from the inherent limitations on the accuracy of Mooney viscosity determinations. Particularly in the case of highly resinified samples, heterogeneity of the Mooney sample causes error.

The characteristics of the heat-softening curves are changed by such polymerization variables as the original Mooney viscosity of the polymer, hydrocarbon conversion,[7] type of modifier,[8] and degree of modification. The nature of the non-rubber material, such as fatty acid, can also change the heat softening characteristics. The method of coagulation[8] and the type of short-stop agent[9] have been reported to affect the heat softening.

Summary and Conclusions

GR-S can be softened by heating in air, but continued heating tends to cause it to resinify. The rate of softening and subsequent resinification depend on a number of factors, e.g., the presence of antioxidant, the temperature of heating, the amount of surface exposed, and the molecular structure and molecular weight distribution. Then benzene solubility of GR-S is, in general, reduced by thermal treatment in the presence of air. Sunlight causes a rapid resinification of raw GR-S exposed in fairly thin sheets.

Acknowledgment

The author wishes to acknowledge the cooperation of the Goodyear chemical engineering division in the preparation of the polymers and the assistance of R. W. Schrock in the laboratory work. The permission of The Goodyear Tire & Rubber Co. for publication of this paper is appreciated.

[7] Poirer, Eberly, and Bebb, Firestone Tire & Rubber Co., private communication.
[8] R. W. Hobson, Goodyear Tire & Rubber Co., private communication.
[9] J. W. Schade, University of Akron, Government Laboratories, private communication.

West Coast Industry

(*Continued from page* 656)

freedom from sometimes fettering tradition is providing a "free climate" productive of an infinite variety of new ideas. Many rubber technicians are of that opinion.

Among them is Ernst Eger, United States Rubber Co. development engineer, who has located his laboratories in the Los Angeles plant of that company.

"Southern California and the Pacific Coast," he said recently, "constitute a young and vigorous region. Its engineers, unhampered by the traditional way of doing things, are pushing into new and promising fields."

Estimates of the 1945 value of the Pacific Coast's mechanical rubber goods production are incomplete at this writing. One expert estimated that it will prove to be in the neighborhood of $20,000,000.

The 1946 production value? Even the experts are shaking their heads, muttering figures of from 25% on up. The region's rubber goods industry, they point out, is stretching out, with no danger of a rebound.

NEW OUTLETS for RUBBER through LATEX[1]

Charles J. Mighton[2]

THE rapid growth of rubber manufacturing processes involving the use of natural and synthetic rubber latex is one of the most interesting developments of recent years.

Prior to 1920 practically all manufacturing processes for making rubber goods started with the use of coagulated rubber. Latex was practically unknown except in rubber-producing countries. The first step toward a wider use of this material in the manufacture of rubber products was the improvement of preserving methods so that latex could be shipped without spoiling in transit from the rubber plantation. Naturally the cost of shipping, per pound of dry material, was greater than that for crude rubber, but, in the early 20's, latex began to be used in the manufacture of some products formerly made by dissolving crude rubber in solvents. By 1930 coagulating dip methods for making relatively thick articles with one dip, or at most three dips, had been developed, and the use of latex expanded rapidly. Some of this expansion was the result of replacing processes utilizing crude rubber, but a large part of it was due to the development of new rubber products made from latex.

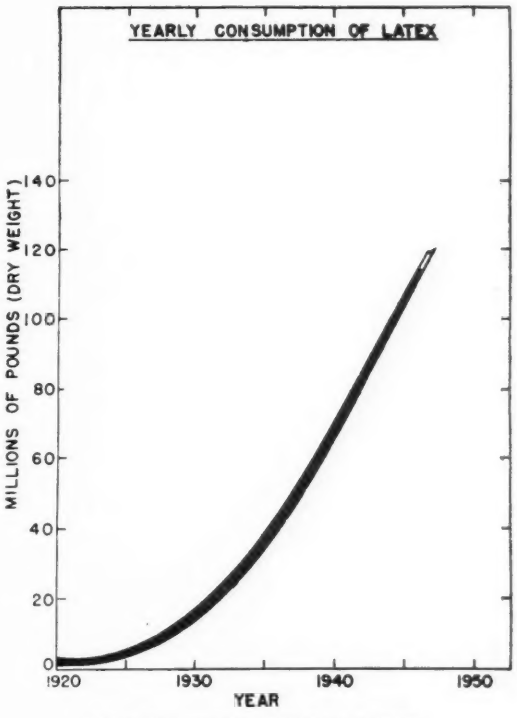
Developments of the 1930-1940 Period

In the years immediately following 1930, methods for making extruded thread, foam sponge, and gelled molded products from latex were developed, and its use continued to grow even during the depression period of the early 1930's. While it is true that some extruded thread replaced the cut webbing thread then in common use, the fact that new kinds of elastic fabrics could be made from round latex thread was responsible for a large part of the rapid expansion of this market. The manufacture of molded products and large sized balloons from gelled latex also opened up entirely new markets for rubber goods. Perhaps the most outstanding example, however, of a new product and an expanded use for rubber goods is that of foam sponge. Foam sponge is unique as a cushioning material owing to the low densities attainable, ability to "breathe," good wearing qualities, and, perhaps most important, its comfort. These properties enable foam sponge to compete with and displace conventional spring constructions. Likewise, low-cost, latex-bonded fibers are offering strong competition for conventional spring constructions.

The effect of such developments on latex consumption since 1920 is illustrated in Figure 1. Between 1930 and 1940, when coagulating dip and gelation processes, as well as methods for making extruded thread, foam sponge, bonded fibers and new types of adhesives were put into practice, latex consumption expanded from about 10,000,000 pounds per year to approximately 75,000,000 pounds per year. During the war years the use of latex continued to increase, and it is estimated that in 1946 approximately 110,000,000 pounds of elastomers were consumed as latex. Particularly noteworthy is the fact that practically all latex consumed during this period was synthetic.

Synthetic Latices

Prior to 1940, synthetic latices were known, of course, but were used mostly for special purposes. Those made by butadiene-styrene copolymerization had been thought inferior to natural latex and were considered more or less laboratory curiosities. They were improved rapidly during the war, and at present they represent our largest source of latex. Those made from butadiene and acrylonitrile had been used in a small way where products of extreme oil resistance were required. Neoprene latices, made from chloroprene, were announced in 1932 and had the longest record of commercial use.



Latex Consumption 1920 through 1946

The early neoprene latices were somewhat difficult to compound, but gave products which aged well and showed excellent oil and sunlight resistance. As a result, many specialty applications developed to take advantage of these superior properties. Research led steadily to improvements and by the end of the war neoprene latices could be used and were used to make almost all products formerly made from natural rubber latex, as well as those made exclusively of neoprene prewar. Butadiene-acrylonitrile and "Thiokol" latices also played their part and expanded the use of elastomers through entry into fields where rubber would not work.

Increased Use of All Latices Expected

Looking forward, latex, both synthetic and natural, seems destined for an even bigger role in the rubber industry. Its expansion may take several forms. Processes are continually being developed which take advantage of the following unique properties of latex:

[1] Paper presented before Akron Rubber Group, Akron, O., on November 22, 1946.

[2] E. I. du Pont de Nemours & Co., Inc., rubber chemicals division, Akron, O.

1. Latex, as a liquid, can be made to conform to almost any shape without application of appreciable work. It is capable of deformation with small forces and may be set in a variety of shapes.

2. Latex can be compounded without mastication, with an overall saving in power consumed and elimination of the possibility of polymer degradation.

3. Latex compounds, as colloids, can be coagulated so that all of the ingredients in the suspension, *including the water*, are isolated in the exact proportions in which they were present in the original mix. Practically, this means that dipping into a bath may be continued without any appreciable change in compound composition.

The first unique property, ability to assume almost any shape without application of appreciable work, may well result in the use of latex in certain manufacturing operations now involving dry polymers. For example, it should be possible to extrude a heat-sensitized latex mix with a lower power consumption than is involved in the extrusion of dry polymer. As another example, there is no real reason why seamless dipped articles, far larger than any now made, cannot be manufactured to replace articles normally built by hand from dry polymer compounds. The saving in labor may more than offset the cost of making and handling very large molds. In view of the many developments in heat transfer and dipping techniques, it would seem worthwhile for rubber manufacturers to reexamine all manufacturing processes based on dry rubber, having in mind this property of latex.

The second unique property, compounding without mastication, should result in a lower compounding cost for latex due to savings in labor and in power. The preparation of aqueous dispersions for use in latex requires little power of labor. In the case of synthetic latices, this property, plus a basically lower cost as compared to the synthetic dry polymers, may result in a decided advantage. A further advantage of latex compounding is the leeway allowed. Since there are no mastication and heating of the rubber involved, ultra accelerators may be used to produce very fast cures with a much greater degree of safety. Finally, the properties of the vulcanizates of latex are often superior owing to the fact that the individual rubber particles are not broken down.

The third unique property, simultaneous isolation of all the ingredients in a latex mix in the proper proportions, is one that is taken for granted, but too often not thoroughly appreciated. It is one of the principles upon which is based the successful commercial use of coagulating and gelling processes, which make up a large part of the use of latex.

The further expansion of markets for latex products may be expected from a second cause which is held in common with dry polymers. New synthetic polymers and latices, suitable for making products to meet service conditions too severe for products made from existing elastomers, can be confidently predicted. An example of such a development is a special latex developed as a carrier for bonding agents used to secure exceptional adhesion between nylon or other synthetic fibers and elastomers. Adhesives prepared from this new latex give bonds of 40-60 pounds per inch compared to 5-10 pounds for corresponding natural rubber latex adhesives. Other examples are plastic-elastomer mixtures being used as adhesives, coatings, and saturants; also the ever-expanding group of latex-bonded fibrous and granulated materials which are invading the upholstery, vibration, and sound dampening and protective underlay fields. For many of these products, binders are required which have unusual characteristics. Very stiff but flexible polymers may be made to give high load-carrying capacity. Polymers having elasticity and, with it, unusual flex-life, ozone resistance, heat resistance, age resistance, and flame resistance may be made. It is not always possible to have all properties in high degree in one polymer, but it is often possible to find a polymer which is exceptional in the property or properties essential to a product designed for a certain use.

In addition to the ability to produce new polymers, industry can produce new types of latex of a given polymer. Through the use of novel dispersing and emulsifying agents with chloroprene, for example, either positively or negatively charged latices may be made which have exceptional stability in the presence of acids, alkalies, or salts which normally coagulate conventional latices. Thus for uses requiring an acidic latex, such as impregnation of wool, it is relatively easy to design a synthetic latex to do the job.

Polymerization conditions may be varied to give latices which are readily coagulated by mechanical pressure alone, which show unusual wetting power, or which wet or foam with difficulty. The fact that latices of varying degrees of pressure sensitively can be made allows for much greater latitude in types of adhesive applications possible with synthetic latex, for example, a special type of synthetic latex of the same polymer. This characteristic is important in certain manufacturing operations such as those involved in the shoe-building industry.

A large range of surface tensions is possible, and the size of the dispersed particles may be varied. Latices with an extremely low content of electrolytes can be made for special uses in electrical fields.

The possibilities of new applications for latex as a result of development of new compounding ingredients and techniques should not be overlooked. As an example, a colloidal form of silica has been developed recently which is admirably suited for latex use. As little as 3% of this silica in foam sponge increases the load carrying capacity about threefold. Thirty to 40 parts of conventional fillers would be required for the same effect.

Summary and Conclusions

During a relatively short period, we have witnessed a tremendous growth in the volume of rubber consumed and in the number of products made from latices of one type or another. It is especially significant that two new uses of latex, the production of foam sponge and bonded fibers, may increase the outlet for rubber and rubber-like materials by hundreds of millions of pounds per year. Furthermore manufacturers of synthetic elastomers have already reached the stage where new elastomers and latex building are almost a daily occurrence. Many of these new elastomers and latices will mean additional new business for our industry and more interesting jobs for all of us.

"Lead and Zinc Pigments and Zinc Salts." By Helena M. Meyer and Alethea W. Mitchell. Chapter reprint from "Minerals Yearbook, 1945." Bureau of Mines, United States Department of the Interior. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price, 10¢. 20 pages. This publication gives statistics and information on the production of lead and zinc pigments and zinc salts, the consumption by industries of the various pigments and salts, their producers and plants, the raw materials used, their prices, and their foreign trade.

Outlook for Hevea Latex[1]

Arthur Nolan[2]

The Author

(Shelburne Studios)

THE consumption of liquid latex in the U.S.A. has been steadily increasing during the past 20 years as its utility became more widely known to the rubber industry as well as its application to new manufactured products.

During 1940, U.S.A. latex consumption was about 2,900 tons dry rubber a month, consisting of about 2,500 tons of *Hevea* latex, negligible synthetic, and perhaps 400 tons a month of reclaimed rubber latex.

Current U.S.A. latex consumption is on the order of 4,975 to 6,425 tons a month, made up of approximately 600 tons of *Hevea*, 2,000 to 2,500 of GR-S, 1,375 to 1,725 of neoprene, and 1,000 to 1,500 of reclaimed rubber latices. Such consumption figures do not consider that U.S. foam sponge factories are operating only at a fraction of their current capacities, which capacities are undergoing considerable expansion during '47 and '48. It has been estimated that total U.S. latex requirements would reach 10,000 tons per month in the near future.

It is to be expected that some synthetic and reclaim latices will be used, even were *Hevea* latex available in adequate quantities and at reasonable prices, since these alternates possess special properties or characteristics. One man's guess would doubtless differ from another, but asuming this use to be 1,000 tons a month, there would still be required some 3,000 to 9,000 tons a month of *Hevea* latex.

Prewar Production

STATISTICAL SUMMARY

(Data below are estimated monthly tonnage figures on a dry content basis.)

Tons Dry Rubber Monthly	*Hevea* Latex	Other Latices
1940 world production	3,730	....
1940 Malayan production	1,907	....
1940 U.S.A. consumption	2,500*	400*
Current U.S.A. consumption	600	4,375 to 5,725
Current U.S.A. demand	5,000	?
Potential 1948 U.S.A. demand	9,000	1,000

* Approximate.

Malaya, Sumatra, and Liberia made up the bulk of the 3,730 tons average monthly world latex produced during 1940.

Netherlands India accounted for 1,468 tons of this figure. Assuming that political and rehabilitation problems may prevent N.E.I. production from reaching U.S. during 1947, and Liberia continuing at its present rate, it falls upon Malaya, producing 1,907 tons average monthly in 1940, to meet a U.S.A. demand of 5,000 to 9,000 tons dry rubber content a month.

Competing with the U.S.A. for this 1,907 tons a month of prewar production also is the rest of the world whose postwar requirements are estimated at about 1,000 tons a month.

Trees and Estates

It is reliably reported and witnessed that not sufficient trees were lost during the war to reduce materially Malayan capacity to produce rubber, which capacity in 1941 was about 50,000 tons a month.

It is obvious that only a fraction of this capacity can be turned over to latex. Much of it consists of holdings too small to produce latex economically or are geographically poorly located for latex production. However it seems a reasonable assumption that at least 10% of the crop (5,000 tons a month) could be turned to latex, which would meet U.S.A. requirements until such time as Sumatra would come into latex production.

Labor and Equipment

While labor is a primary problem in Malaya, crude rubber *is* being produced in large volume. It is logical to conclude that latex producers will obtain sufficient estate labor.

The U.S.A. latex requirement, while it can exist on drummed latex and unconcentrated types, is for concentrated bulk latex. This necessitates central processing factories for creaming and centrifuging as well as tidewater shiploading facilities.

Numerous centrifuges remained in Malaya, in working order; while others can be quickly rehabilitated. Of course many were removed, irreparably damaged, or run to exhaustion. However those remaining together with those purchased prewar and held elsewhere, and the few being delivered now, will produce a substantial quantity of the centrifuged type. Deliveries on latex centrifuges are estimated as taking from 12 to 18 months.

The remainder of the latex will move as creamed or normal latex. The emphasis will be on creamed latex since its production requires only more tanks than are required for 40% latex production.

Malayan stocks of steel for tanks and piping are small and rapidly dwindling. It is expected most steel supplies will have to come from U.K. or U.S.A., and there are good prospects of receiving substantial supplies from Australia. However, since the quantities required are so very small, it is expected this will not be a bottleneck, but will doubtless cause delays. In emergencies or in interim periods it is expected that teakwood or concrete may be used in tank constructions.

Latex production requires ammonia, and cylinders are necessary for its transport. It was expected a shortage of these cylinders would hinder production. However more and more of the prewar cylinders are making their appearances, and additional supplies have been developed, eliminating this threat.

The procurement of motors and valves is a problem, but since so little of this type of equipment is required, it should not be a serious one. Engines for air compressors or generators and the compressors themselves are slowly becoming available from current supplies or military surpluses.

Chemicals

Between 75 and 125 pounds of ammonia are required

[1] First presented in Lockwood's January 15 Rubber Report and revised somewhat for publication in India RUBBER WORLD.

[2] Vice president, Latex Distributors, Inc., 80 Broad St., New York 4, N. Y.

per ton of latex, depending upon the type-latex produced. Currently it appears there will be sufficient supplies from either U.S.A. or United Kingdom sources to meet Malayan latex ammonia requirements. Cylinders for transporting the ammonia are being provided in sufficient numbers.

Creaming agents are in supply now, but as demand increases, it is expected facilities for their production may have to be increased, or local Malayan gums used. The preferred types of creaming agents, alginates, etc., are imported into Malaya. However, it is expected that this demand is being anticipated and will be provided for.

Drums

Practically all the available drums now in Malaya are being used to ship latex to continental Europe, and the drum situation is acute. There are still some second-hand Diesel fuel drums in Malaya, but it is expected these will soon disappear.

There is a Singapore drum fabricating plant starting production early this year. It will operate initially on steel from India, but expects to use regularly Australian steel. In emergencies, however, U.S.A. or United Kingdom steel will be used since the firm is a combination of U. S. and British interests.

The acuteness of this drum situation, however, warrants prompt erection of bulk handling facilities.

Shiploading Facilities

One large Singapore unit for ship loading of bulk latex was quickly put into operation after Jap occupation, and it now provides the U.S.A. with the only Malayan latex now being shipped here.

The only other American operated installation in Malaya was badly damaged and is now undergoing reconstruction and repair. It is expected that latex will pass through it to the U.S.A. during the first quarter of 1947.

Since these two units will not be able to ship all the bulk latex the world requires, a number of new facilities are to be erected. Four plants are scheduled, and it is expected that at least one of these new plants will be shipping latex during the second quarter of 1947.

Surveys of the three major Malayan deepwater ports show that latex loading facilities can be built at all three, as land is available as well as access to latex tanks ship berths. Here again steel tanks, compressors, and engines, piping and valves are problems, but not necessarily bottlenecks.

Land Transport

Latex is collected and transported to the field collecting stations, central factory, and to the tidewater shiploading plant by tank trucks and/or railroad tank car.

Tank trucks are not plentiful since there seems to be an insufficiency of motor transport all over the world; but military petrol and water tank trucks are finding their way into latex service through surplus sales. In addition new production is also being received.

Malayan railroad tank cars are more of a problem. The F.M.S. Railway is badly in need of much rolling stock, and deliveries are slow. Here again, nevertheless, old cars are being reconditioned for service and new cars ordered.

Ocean Transport

Prewar there were 70 to 80 ships operating on the Far East-U.S.A. run that were equipped to carry bulk latex. Many of these vessels are no longer afloat, but their operators are aware of the latex trade and are looking forward again to handling liquid latex. Many of the newer ships are adequately equipped, and there are more American flag vessels now operating in the Orient than prewar.

U. S. steamship companies seem to be on their toes and give evidence of their readiness to transport 50,000 to 100,000 tons of latex to the U.S. annually

U. S. A. Facilities

Facilities in this country for unloading, transporting, and storing liquid latex are now being operated at appreciably under top capacity, but can be easily and quickly expanded when necessary.

Personnel, as well as the requisite pumps, tank cars, and equipment, have been kept active with periodic arrivals of latex from Liberia and recently from Malaya, as well as in handling large quantities of synthetic latex.

Producers' Zeal

While rubber plantation owners are cognizant of America's latex requirements, they are confused and sometimes discouraged by the action of the British and U. S. governments. Numerous former producers of solid rubber are eager to engage in liquid latex production, but are "marking time" because of the vagueness of the future.

British exchange regulations and government attitude toward war damages, compensation and insurance claims, taxes, labor, rice supplies, and land rents all make difficult computations on their financial returns on capital which must now be invested.

Our own government's actions in delaying the establishment of free trade in rubber in the face of advance advices to the contrary is also confusing to the producer. He has been led to fear synthetic as a competitor and is distrustful of the future.

All in all, he zealously wishes to "get on with it," but must first "sweat out" certain economic and political obscurities.

Conclusions and Recommendations

The U.S.A. is understood to want 50,000 tons of latex during 1947, and at the current rate of production and contemplated production she will not receive this quantity. Clarification of British and American rubber policies may dispel the mists and accelerate the expansion.

In Malaya there are large quantities of latex. All possible producers are not now shipping latex as it is not economical to do so. Many of those now in production or those who soon hope to be, are not sending their latex to the U. S. A., but rather to other markets throughout the world. New producers, and old ones requiring expansion, must have assurances warranting large capital outlays. The U.S.A. market does not give such assurance, despite its enormity and urgency.

Any plan altering the present situation must provide purchasing conditions and pricing reflecting world demand and producers' higher labor, machinery, material, and rehabilitation costs, as well as return on capital—all reasonable expectancies. *No one*, particularly producers, want "run-away" prices.

Three plans suggest themselves:

1. Discontinue government buying and allocations, but retain specification controls, (that is, limiting the amount of natural rubber that can be used in *a* tire, or *a* pound of foam, etc., and thus preventing such large volume uses from siphoning off limited early supplies). This plan would have *all* possible producers actively compet-

(*Continued on page 669*)

A Method of Measuring "Heat Embrittlement" of GR-S and Hevea Rubber Compounds[1]

Allen W. Scholl[2] and J. W. Liska[2]

THIS paper is a description of some studies of the phenomenon variously described in the literature as "heat embrittlement," "heat tenderness," "heat shortening," etc. For purposes of this discussion the term heat embrittlement will be employed in a general sense, to denote the change in breaking elongation resulting from a change in test conditions (i. e., test temperature, cure, or aging). Inasmuch as the expression "heat embrittlement" is purely qualitative, no definite experimental procedure for its determination is implied, such as is implied, for instance, in the term "ultimate tensile strength." Such lack of definiteness in terminology often leads to considerable confusion and the development of widely different test techniques for measuring the same phenomenon. Illustrative of the latter point are two heat embrittlement tests, one introduced by W. B. Wiegand[3] and the other by R. B. Hobson.[4] The first method[3] is based on a measurement of the length of time which a stretched T-50 strip will withstand contact with an iron heated to 400° F. without breaking. In the second method,[4] samples of raw polymers are air-aged for specified periods of time, following which benzene solubilities are determined. The amount of residue remaining after extraction is employed as a measure of the heat embrittlement of the material.

With the exception of Hobson's method, there appeared to be general acceptance of the idea that heat embrittlement was correlated in some manner with breaking elongation. It was accordingly decided in this study to measure breaking elongations directly, under various test conditions, and then to express the results in terms of "heat embrittlement indices," each of which is defined mathematically. Although these definitions were originally derived on purely empirical bases, they appear to yield results capable of unique and useful interpretations, as will be pointed out later.

Test Apparatus

A simple apparatus, shown schematically in Figure 1A and in the photograph Figure 1B, was designed to measure breaking elongations at various temperatures. Ring specimens, "S", one inch I. D. and 1.375 inches O. D., died out of 0.075-inch test slabs, were employed throughout. Ring specimens were chosen in preference to the usual dumbbell strip since jaw separation could be used as a direct measurement of elongation, thus eliminating many of the difficulties of measuring bench mark separations on a sample enclosed in a temperature controlled chamber.

The test unit is essentially an air oven (equipped with automatically controlled heaters "H"), in which are mounted two stainless steel posts "P" (⅜-inch in diameter and free to rotate) one fixed and one movable. The movable post is fastened to an endless chain "C," which is driven at the rate of 20 inches per minute. Thermostatically controlled air is circulated through the test chamber by means of a blower. To reduce heat losses during loading operations, flap valve (not shown) was installed over the outlet of the blower in such a manner that air circulation was cut off as soon as the loading door was opened. Closing of the door lowered the flap valve, thus allowing free circulation of air during the preheating and actual testing operations.

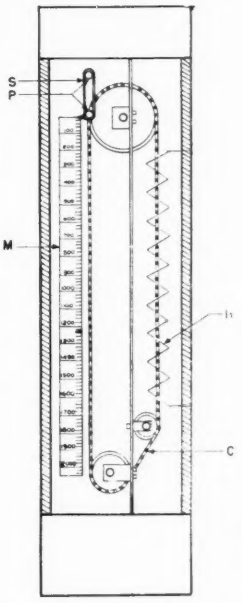


Fig. 1A. Schematic Drawing of Heat Embrittlement Apparatus

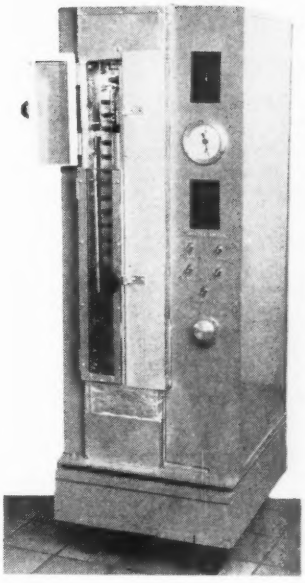


Fig. 1B. Photograph of Heat Embrittlement Test Apparatus

General Test Method and Calculations

Preliminary tests (made by inserting fine wire thermocouples in the center of the test piece) indicated that the ring samples employed reached the test temperatures used in 60 to 70 seconds after being placed in the test chamber. As an added precaution, a preheating time of 90 seconds was finally adopted as standard, since this also provided a reasonable time schedule for loading the preheated sample on the posts, elongating it to break, noting the elongation on the scale "M", declutching the motor drive, and returning the movable post manually to its original position.

For most of the tests described, standard test temperatures of 100 and 200° F. were employed.

Now the difference between the breaking elongations at these two temperatures is certainly a measure of heat embrittlement. It is, however, equally certain that this difference is not adequate in itself, since a very "short" compound might have a small difference and thus would be considered to have good heat embrittlement characteristics. Specification of the magni-

[1] The work reported in this paper was carried out under the sponsorship of the Office of Rubber Reserve, RFC, in connection with the government's synthetic rubber program.
[2] Chemical and physical research laboratories, Firestone Tire & Rubber Co., Akron, O.
[3] Private communications from W. B. Wiegand, Columbian Carbon Co., May 7, 1943; June 16, 1943; Aug. 26, 1943, and Nov. 30, 1943.
[4] Private communication from R. W. Hobson, Goodyear Tire & Rubber Co., June 8, 1944.

tude of the breaking elongations at, say, 100° F. plus the difference in the breaking elongations at 100 and 200° F. would aid in interpreting the data correctly, but this method has the obvious disadvantage of yielding a dual number quality index. Reduction of the data to a percentage basis, i.e., division of the difference in breaking elongations by the breaking elongation at 100° F., was also found to be inadequate since it did not sufficiently compensate for "short" stocks. In order, thus, to attain the desired objective, a single index which would (at least in the majority of cases tested) give sufficient weight to the magnitude of the breaking elongation, the following empirical definition of the normal heat embrittlement index F_H was evolved.

$$F_H = \frac{E_{100} - E_{200}}{(E_{100})^2} \times 10^4 \qquad (1)$$

where E_{100} is the breaking elongation at 100° F., and E_{200} is the breaking elongation at 200° F.

The factor 10^4 was introduced simply as a means of obtaining whole numbers, rather than decimals, for use as indices.

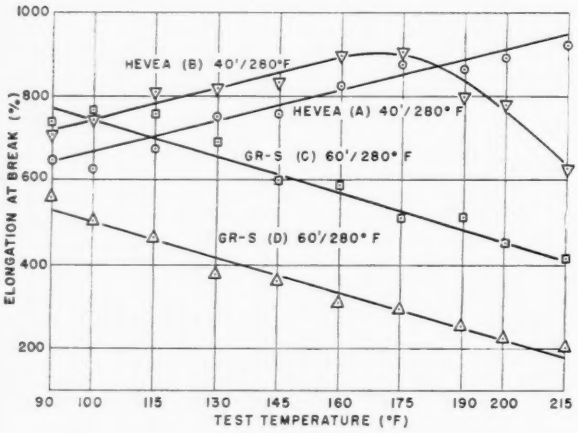


Fig. 2. Effect of Test Temperature on Breaking Elongation

Although this definition is admittedly empirical, it does have mathematical implications: namely, that the percentage decrease in breaking elongation and the reciprocal of the breaking elongation at 100° F. are of equal weight or importance in determining the magnitude of the heat embrittlement index. One furthur advantage appears on examination of *Hevea* rubber and GR-S compounds by this method. In the former instance (for normal or slightly aged samples) negative values of F_H are obtained, since E_{200} is greater than E_{100}.

Typical data, showing the relation between test temperature and breaking elongation of two GR-S and two *Hevea* compounds are shown in Figure 2. Calculation of the heat embrittlement factors of these compounds yields negative values for the *Hevea* compounds and positive values for the GR-S compounds. *Hevea* compound A was loaded with 41 parts HPC black; whereas B contained 48 parts zinc oxide and 3.2 parts HPC black per 100 parts of polymer. The GR-S compounds C and D were loaded with 40 parts HPC black and a mixture of 13 parts HPC and 14 parts SRF black, respectively, per 100 parts of polymer. The cures employed were commercial optimum cures in all cases.

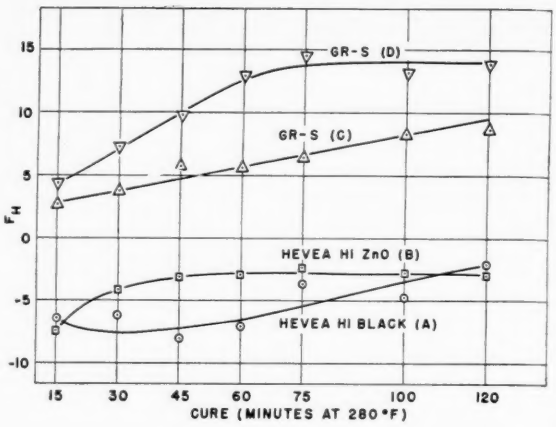


Fig. 3. Effect of Cure on Heat Embrittlement Factor F_H

Discussion of Results

THE EFFECT OF CURE ON THE HEAT EMBRITTLEMENT FACTOR, F_H. The normal heat embrittlement factors, F_H, of two GR-S and two *Hevea* compounds are shown in Figure 3. The heat embrittlement factors for the *Hevea* compounds, although negative, increased with increased time of cure and remained negative even for the 100% overcures. The *Hevea* compound containing high ZnO is seen to have larger F_H, values than the carbon black compound for the commercial optimum cures. The heat embrittlement factors for the GR-S compounds also increased with increased time or cure, although they were positive throughout the curing range studied.

THE EFFECT OF AIR AGING ON THE HEAT EMBRITTLEMENT FACTORS F_H OF TREAD-TYPE COMPOUNDS. Normal heat embrittlement factors, F_H, were obtained on *Hevea* (E) and GR-S (F) tread-type compounds (each loaded with 45 parts HPC black per 100 parts of polymer), which had been air-oven aged at 212° F. for various periods of time up to 72 hours.

The data, shown in Figure 4, illustrate the fact that F_H increases with time of aging for both *Hevea* and GR-S compounds, although for the early part of the aging period F_H is negative for the *Hevea* compound.

The data also indicate the possibility that upon further air aging, the *Hevea* compound might be poorer than the GR-S compound from the standpoint of heat embrittlement. This possibility is probably not important from a practical viewpoint, however, since in both cases the

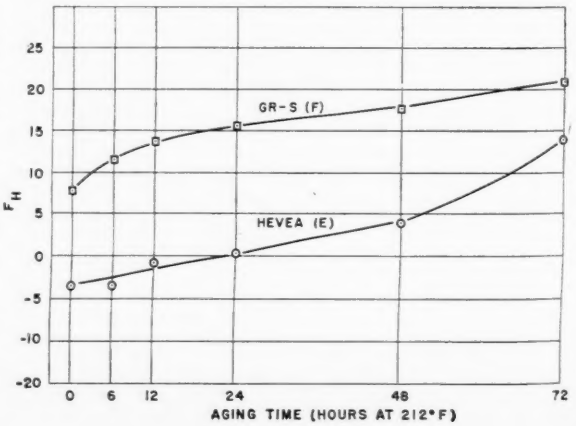


Fig. 4. Effect of Air Oven Aging on F_H

physical properties are very low after 72 hours of air aging at 212° F.

THE EFFECT OF ACCELERATORS ON THE HEAT EMBRITTLEMENT FACTOR F_H. Six experimental GR-S compounds cured with Santocure, Monex, Altax-DPG, Altax, Erie-Safex, and Captax-litharge accelerators were tested by the technique described. The compounds used were typical GR-S mixes containing 45 parts EPC black per 100 parts polymer. The results of the heat embrittlement tests are shown in Table 1.

TABLE 1. EFFECT OF ACCELERATORS ON F_H

Stock	G	H	I	J	K	L
Feature	Santo-cure	Monex	Altax-DPG	Altax	Erie-Safex	Captax-Litharge
Curing Time (Min. @ 280° F.)	Caluclated Heat Embrittlement Factors, F_H					
20	—	—	—	—	—	3.6
30	4.2	5.1	6.6	—	—	4.3
35	—	—	—	—	—	—
40	—	5.3	—	—	—	6.0
45	5.8	—	—	—	5.3	—
50	—	5.9*	5.8	—	—	5.5*
60	6.8*	—	—	7.3	7.6	—
65	—	5.8	6.0*	—	—	6.4
75	7.8	—	—	—	6.4*	—
80	—	5.8	—	5.4	—	7.0
85	—	—	6.1	— *	—	—
100	8.1	5.5	—	6.4	6.5	—
110	—	—	6.8	—	—	—
120	8.2	—	—	—	—	—
125	—	—	—	—	7.4	—
130	—	—	7.8	6.6	—	—
150	—	—	—	—	6.7	—
160	—	—	—	8.0	—	—
200	—	—	—	8.0	—	—

*Commercial optimum cure.

The data indicate that at optimum cure for each of the compounds tested the effect of the various accelerators on F_H was small; the Captax-litharge combination was slightly the best, and Santocure the worst. The effect of overcure on F_H, however, was found to be small in the case of the Monex compound. Compounds containing each of the other accelerators tested were found to have F_H values which increased appreciably with time of cure.

THE EFFECT OF ANTIOXIDANTS ON THE HEAT EMBRITTLEMENT FACTORS F_H OF GR-S COMPOUNDS. A large batch of antioxidant-free GR-S latex was prepared and then divided into several portions. To each portion one of the materials listed below was added as a stabilizer before coagulation. The antioxidants used were:

2% AgeRite Powder
2% Neozone A
2% Santoflex B
2% B-L-E
2% Stalite
2% Santoflex BX
2% Flectol H
2% AgeRite Resin
2% V-G-B
2% Stabilite

TABLE 2. BASE RECIPE—ANTIOXIDANT SERIES

Ingredient	Amount
GR-S	100.0
Santocure	1.7
Sulfur	2.0
Zinc oxide	3.3
HPC black	40.0
Paraflux	4.5
Bardol	4.6
Pine tar	1.0
Total	157.1

TABLE 3. HEAT EMBRITTLEMENT FACTORS—ANTIOXIDANT SERIES

Feature	F_H
AgeRite Powder	3.3
Neozone A	5.2
Santoflex B	3.7
B-L-E	3.5
Stalite	4.3
Santoflex BX	4.6
Flectol H	4.2
AgeRite Resin	4.2
V-G-B	4.1
Stabilite	4.8

The base recipe used in compounding is given in Table 2. Test slabs were cured 60 minutes at 280° F. The ring specimens were prepared and tested, as previously described, and the heat embrittlement factors F_H were then calculated. The corresponding heat embrittlement factors F_H are given in Table 3.

The Neozone A-GR-S compound was found to give the largest heat embrittlement factor and therefore would be judged the most undesirable of those tested.

THE EFFECT OF SULFUR CONTENT ON THE HEAT EMBRITTLEMENT FACTOR F_H OF GR-S COMPOUND. Six GR-S compounds were prepared with various amounts of sulfur (1.0 to 3.5 parts in increments of 0.5-part), according to the formula shown in Table 4.

An increase in the amount of sulfur was found to increase the heat embrittlement factors, over the range of cures investigated. The compounding features and the corresponding heat embrittlement factors are given in Table 5.

TABLE 4. BASE RECIPE—SULFUR SERIES

Zinc oxide	2.4
Sulfur	Variable
Stearic acid	2.5
AgeRite Powder	0.6
Pine tar	2.6
Bardol	4.0
EPC black	45.0
Santocure	1.2
GR-S	100.0

TABLE 5. HEAT EMBRITTLEMENT FACTORS OF SULFUR SERIES COMPOUNDS

Compound Feature Parts Sulfur	1.0	1.5	2.0	2.5	3.0	3.5
Min. Cure at 280° F.	Heat Embrittlement Factor					
30	4.6	4.8	4.2	4.4	6.0	5.6
50	4.4	5.4	6.1	6.6	9.0	9.5
75	4.7	6.5	8.1	8.6	11.5	11.8
100	5.1	7.0	8.5	10.0	11.7	14.5
125	5.7	7.1	9.1	10.3	13.1	13.3
150	5.5	6.7	10.2	11.0	12.4	13.0

It is interesting to note that the above results agree with those of Vila,[5] who also concluded that high sulfur led to "short" or brittle compounds.

General Conclusions and Discussion

The methodological definition of a heat embrittlement factor evolved in this work appears to yield results which are consistent with experience, indicating a fundamental difference between *Hevea* and GR-S compounds and providing a single index value for comparison purposes.

The apparatus described is simple and can readily be reproduced.

Consideration of the definition of F_H and some of the factors which affect elastomer quality suggests rather interesting variations in the methods described. It is possible, for instance, to define heat embrittlement factors other than the one described earlier in the report by the name, normal heat embrittlement factor F_H. A factor F_H', defined by the expression

$$F_H' = \frac{E_N - E_A}{E_N^2} \times 10^4 \qquad (2)$$

where E_N = elongation at break of normal stock, and E_A = elongation at break of aged stock, would yield information regarding the effect of aging on heat embrittlement.

Similarly,

$$F_H'' = \frac{E_N - E_{OC}}{E_N^2} \times 10^4 \qquad (3)$$

(*Continued on page 731*)

[5] G. R. Vila, *Ind. Eng. Chem.*, 34, 1269 (1942).

A Tetrafunctional Graph for Appraising Plasticizer Performance in Vulcanized Rubbers

T. C. Patton[1] and M. K. Smith[1]

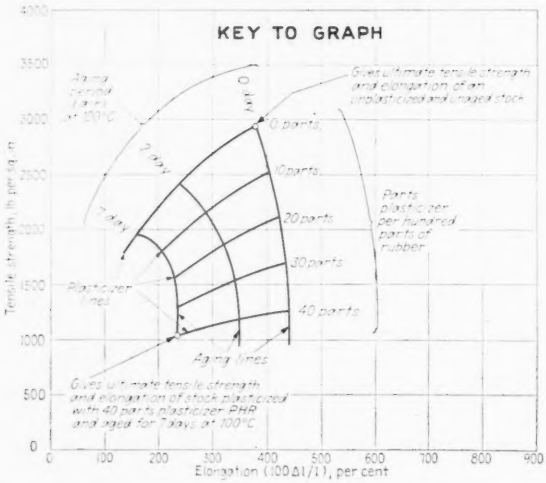

KEY TO GRAPH
Gives ultimate tensile strength and elongation of an unplasticized and unaged stock
0 parts
10 parts
20 parts
30 parts
40 parts
Parts plasticizer per hundred parts of rubber
Plasticizer lines
Aging lines
Gives ultimate tensile strength and elongation of stock plasticized with 40 parts plasticizer PHR and aged for 7 days at 100°C
Tensile strength, lb per sq in
Elongation (100 Δl/l), per cent

Fig. 1. Example of Tetrafunctional Graph for Appraising Plasticizer Performance

IN SEARCHING for a concise and readily comprehensible method for presenting data relating to the modification produced in the properties of a cured rubber through plasticizer addition, there was evolved a type of diagram which is believed to be new and which permits, in a matter of moments, a comprehensive view of a plasticizer's performance in a vulcanized rubber. The diagram, however, does not attempt to give any index as to the processing or milling efficiency of a plasticizer.

The diagram is termed a tetrafunctional graph, since any point on the graph gives the inter-relation of the following four quantities: (1) the ultimate tensile strength and (2) the ultimate elongation of a plasticized rubber stock (3) aged for a definite period and (4) plasticized with a specific proportion of plasticizer.

However, and possibly more important, the graph also permits a ready appraisal of other vital characteristics of a plasticized rubber: namely, (5) aging resistance; (6) plasticizer volatility; (7) plasticizer effect on tensile strength and elongation; (8) plasticizer-rubber compatibility.

Linear coordinates are the basis of the tetrafunctional graph; the X and Y axes carry % elongation and tensile values, respectively. On this graph are plotted the ultimate tensile strengths and the ultimate elongation values of unaged and aged stocks, without plasticizer and with varying amounts of plasticizer. Aging data reported in this article were obtained by subjecting rubber samples to two and seven days heating at 100° C. in a forced draft oven. It might be at first expected that such extensive plotting on a single graph would lead to a confused and overlapping series of points. Such is not the case, however, and it was found that without exception all experimental points could be inter-connected with an orderly network of lines corresponding respectively to different aging periods (aging lines) and to different plasticizer contents (plasticizer lines). (See Figure 1.) Lines of this graph should not be confused with the lines of a continuous stress-strain diagram. Curves were drawn through the plotted points of the graph to give smoothed (averaged) values. Undoubtedly such smoothed values are more significant than the individual plotted points through which the curves were drawn.

The plasticizers selected to illustrate the use of the graph are all commonly employed commercial materials.

The curing temperature and the four curing periods employed for each synthetic rubber type are tabulated in Table 1. Only values obtained at optimum cure were used in compiling this report.

TABLE 1

Synthetic Rubber	Curing Temperature	Curing Periods
GR-S	292° F. (45lb/in²)	45, 60, 75, 90
Hycar OR-15	307° F. (60lb/in²)	30, 45, 60, 75
Perbunan	307° F. (60lb/in²)	45, 60, 75, 90
Neoprene GN	292° F. (45lb/in²)	30, 45, 60, 75

The four standard formulations noted in Table 2 were used throughout this investigation.

TABLE 2

GR-S Compound Formulation	
GR-S	100.0
Zinc oxide	5.0
MPC black (Continental "A")	50.0
Mercaptobenzothiazole (Captax)	1.5
Sulfur	2.0
Plasticizer	0 to 40.0
Hycar or 15 Compound Formulation	
Hycar OR-15	100.0
Zinc oxide	5.0
MPC black (Continental "A")	50.0
Stearic acid	0.5
Benzo thiazyl disulfide (Altax)	1.5
Sulfur	1.5
Plasticizer	0 to 40.0
Perbunan Compound Formulation	
Perbunan	100.0
Zinc oxide	5.0
MPC black (Continental "A")	50.0
Stearic acid	1.0
Benzothiazyl disulfide (Altax)	1.0
Sulfur	2.0
Plasticizer	0 to 40.0
Neoprene GN Compound Formulation	
Neoprene GN	100.0
Calcined magnesia	4.0
Zinc oxide	5.0
MPC black (Continental "A")	58.0
Stearic acid	0.5
Phenyl-alpha-naphthylamine (Neozone A)	2.0
Plasticizer	0 to 40.0

Aging Resistance

It can be accepted as a general criterion of aging resistance that the less a rubber changes in its physical properties on aging, the greater is its aging resistance. Such changes in the physical properties of a rubber are conveniently indicated on the tetrafunctional graph by the relative spacing of the aging lines. Close spacing indicates little physical change and hence good aging re-

[1] Baker Castor Oil Co., 120 Broadway, New York, N. Y.

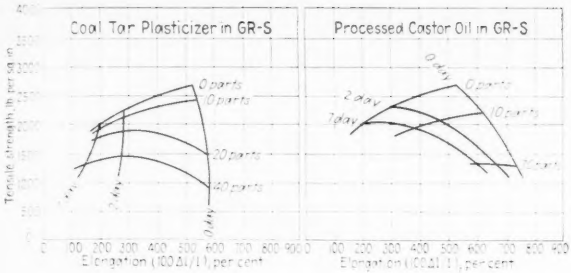


Fig. 2. Example of Use of Graph to Show Differences in Aging

sistance. Conversely, wide spacing indicates a radical change in the physical properties of a rubber and corresponding poor aging resistance.

In Figure 2, an example is submitted which illustrates an extreme difference in aging resistance. Tetrafunctional graphs of two GR-S stocks, identical in formulation except for choice of plasticizer, are compared. The closely spaced aging lines of the processed castor-oil plasticizer graph as opposed to the widely spaced aging lines of the coal-tar-type plasticizer graph show at once a marked superiority of the castor-oil product over the coal-tar product in resistance to heat aging.

Plasticizer Volatility

As the plasticizer volatilizes, the properties of a plasticized rubber tend to approach the properties of an unplasticized stock. This tendency is reflected in the tetrafunctional graph by the tendency for the plasticizer lines to converge as the plasticizer content is lost by volatilization. Hence plasticizer volatility can be judged by observing the relative convergence of the plasticizer lines on the tetrafunctional graph as aging progresses. Plasticizer lines of highly volatile materials rapidly converge toward a common point; whereas plasticizer lines of non-volatile plasticizers remain essentially parallel.

Reference to Figure 3 illustrates some marked differences found in plasticizer volatilities. Actual volatility measurements have been made for these cases, and these direct measurements fully confirm the interpretation afforded by the tetrafunctional graph. Table 3 compares the measured volatile losses with the losses qualitatively estimated by means of the graph.

TABLE 3. COMPARISON OF VOLATILE LOSS OF PLASTICIZER FROM TWO TYPES OF SYNTHETIC RUBBERS AS ESTIMATED FROM TETRAFUNCTIONAL GRAPH AND BY DIRECT MEASUREMENT (7 DAYS' HEAT AGING @ 100° C.)

Synthetic Rubber	Neoprene GN		Hycar OR-15	
Plasticizer Type	Petroleum Plasticizer	Acetylated Castor Oil	Dibutyl Phthalate	Processed Castor Oil
Plasticizer Volatile Loss Qualitatively Estimated by Reference to Tetrafunctional Graph	high volatility	little or no volatility	very high volatility	very slight volatility
Plasticizer Volatile Loss Calculated from Direct Measurements	67%	0%	84%	6%

Plasticizer Effect on Tensile Strength and Elongation

For present purposes good plasticizer performance in a vulcanized rubber is arbitrarily rated on a basis of the ability of the plasticizer to increase the elongation of a vulcanized stock without unduly impairing its tensile strength. If this concept of a plasticizer's effectiveness in a vulcanized rubber is accepted, then the performance rating of a given plasticizer can be judged from the tetrafunctional graph by observing the direction and relative steepness of the aging lines.

Performance of an unaged vulcanized stock is indicated by zero-day aging lines; whereas retention of this performance on aging is indicated by the aging lines of subsequent aging periods.

A plasticizer which gives essentially vertical aging lines can be considered as having only fair performance characteristics since it reduces tensile strength and contributes nothing toward improving the elongation characteristics of the vulcanized stock. Unless it imparts some unusual property to a rubber stock, a plasticizer which gives aging lines which slope downward to the left (toward origin) is also of doubtful value since it degrades both tensile and elongation qualities. On the other hand a plasticizer which gives aging lines extending toward the right side of the chart is in general desirable since it improves the elongation characteristics of the vulcanized rubber, and the more nearly horizontal the aging lines, the less the tensile reduction and the more preferance the plasticizer.

Figure 4 illustrates three representative cases of plasticizer efficiency. Tetrafunctional graphs for three GR-S stocks, identical in formulation except for choice of plasticizer, are compared. The aging lines of the glycol ester graph converge toward the origin indicating negative performance characteristics. The essentially vertical aging lines of the coal-tar plasticizer graph indicate a neutral or intermediate type of performance. The aging lines of the gelled castor oil graph sweeping out to the right indicate a type of plasticizer action preferred for most vulcanized rubbers.

Plasticizer-Rubber Compatibility

A valuable index to plasticizer-rubber compatibility which ties in closely with good plasticizer performance, is also afforded by the direction and relative slope of the aging lines. Aging lines which slope or converge toward the origin of the graph have been found to be indicative of plasticizer-rubber incompatibility. Conversely, aging lines which sweep or slope to the right and away from the origin are indicative of good plasticizer-rubber compatibility. Evaluation of the degree of compatibility or incompatibility is based on the size of the angle made by the aging lines with the vertical.

Interesting intermediate cases frequently arise where

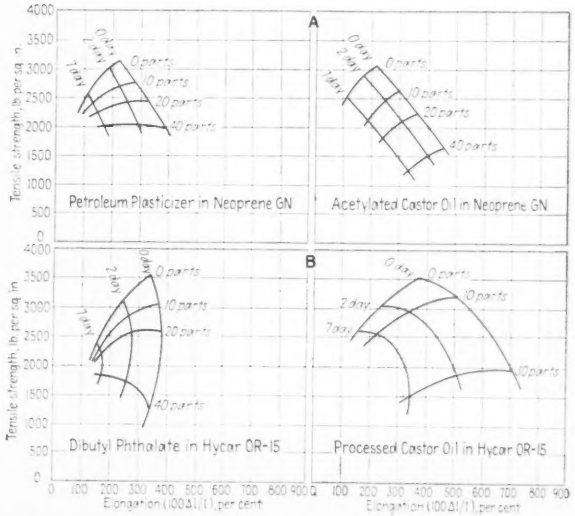


Fig. 3. Differences in Plasticizer Volatility as Shown by Graph

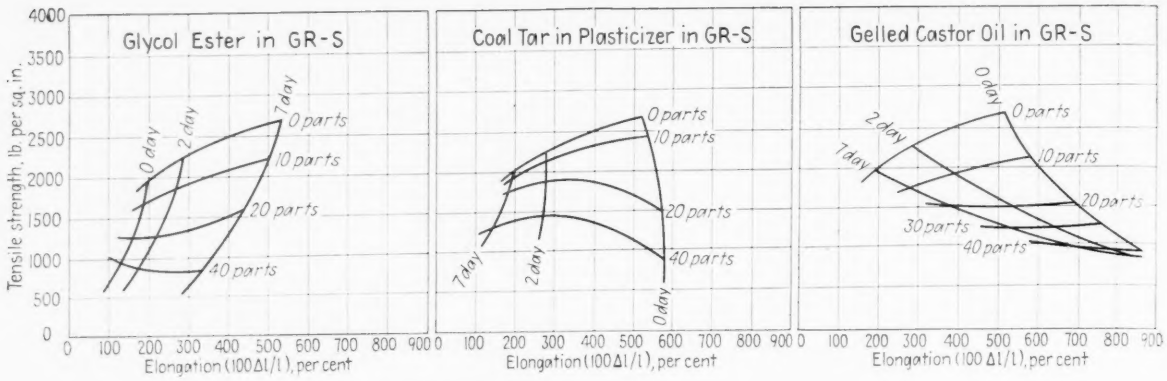


Fig. 4. Plasticizer Efficiency as Shown by Graph

plasticizers exhibit excellent compatibility up to a certain plasticizer content, but develop incompatibility tendences beyond this point.

Figure 5 serves to illustrate some typical plasticizer-rubber compatibilities. Tetrafunctional graphs for castor oil in four synthetic rubbers are given. In GR-S and Perbunan, excellent compatibility is shown throughout the plasticizer range investigated, as shown by the aging lines sweeping to the right of the chart. However with Hycard OR-15 and neoprene, although good compatibility is obtained up to approximately 10 to 15 parts of plasticizer per hundred parts of rubber, incompatibility starts to develop beyond this point as indicated by the change in the direction of the aging lines from a negative to a positive slope. Hence in the case of Hycar OR-15 and neoprene, caution should be employed in the use of castor oil as a plasticizer in excess of 15 parts of plasticizer per hundred parts of rubber; whereas in the case of GR-S and Perbunan such caution is unnecessary.

Practical Applications of the Tetrafunctional Plasticizer Graph

Certain practical applications of the tetrafunctional graph which may not be immediately evident are suggested by the two following cases:

(A) In molding rubber goods, difficulty is frequently

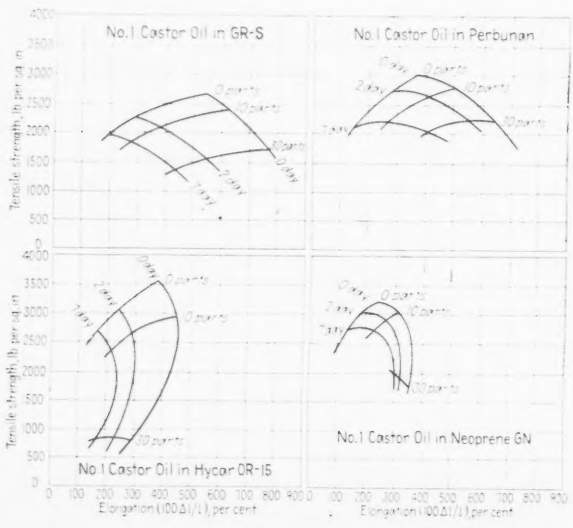

No.1 Castor Oil in GR-S
No.1 Castor Oil in Perbunan
No.1 Castor Oil in Hycar OR-15
No.1 Castor Oil in Neoprene GN
Tensile strength, lb. per sq. in.
Elongation (100 Δl/l), per cent

Fig. 5. Plasticizer Compatibility as Evidenced by Graph

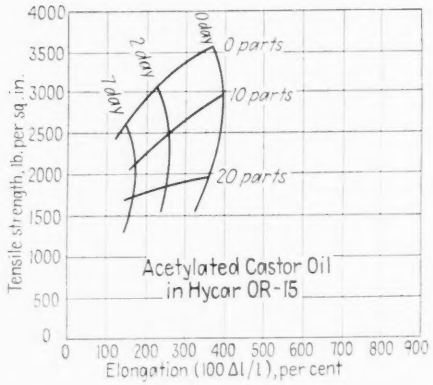


Fig. 6. Compatability of Acetylated Castor Oil in Hycar OR-15

encountered in obtaining proper mold release. To overcome this difficulty, resort is commonly made to (1) the use of mold lubricants or (2) the use of rubber additives which impart anti-stick properties to the surface of the molded rubber product.

The second method is preferable since it eliminates an extra step in the molding cycle. Choice of a proper additive, however, may present somewhat of a problem. In such cases the use of the tetrafunctional graph may notably assist in a solution. It seems to be agreed that mold release additives are ingredients which have limited compatibility with their present stock. Hence there is a tendency for these additives to come to the rubber surface and to exert their mold release action at the metal-rubber interface. To control such action properly it is most helpful to have some clue as to the compatibility characteristics of the rubber-release ingredient. Such information is afforded by the tetrafunctional graph.

For example, Figure 6 is a tetrafunctional graph of acetylated castor oil in a Hycar OR-15 formulation. Inspection of this graph indicates initial compatibility of the acetylated castor oil followed by subsequent tendency toward incompatibility as the plasticizer proportion is increased. Because of this reversal in compatibility, and because acetylated castor oil has resident in it other properties which make it a satisfactory anti-stick agent, its use as a mold release agent is indicated. In this particular example commercial use of this material has confirmed the utility of this material as a mold release agent for Hycar OR-15 molded goods.

(B) In formulating heat resistant stocks, selection

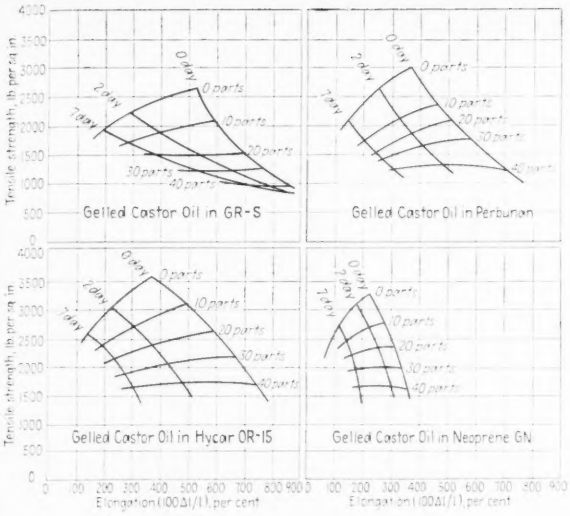

Tensile strength, lb per sq in
Gelled Castor Oil in GR-S
Gelled Castor Oil in Perbunan
Gelled Castor Oil in Hycar OR-15
Gelled Castor Oil in Neoprene GN
Elongation (100Δl/l), per cent

Fig. 7. Resistance to Plasticizer Volatility—Gelled Castor Oil in Various Synthetic Rubbers

of a plasticizer is to a large degree dictated by volatility considerations. Thus for satisfactory continuous performance it is imperative that the properties built into a heat resistant rubber compound be retained over prolonged periods of time. Volatile plasticizers obviously have no place in this type of formulation.

Actual measurement of volatile loss due to heat aging is, of course, a direct index to the rate at which plasticizer is lost from a compound. However, by referring to the tetrafunctional plasticizer graph, not only is the plasticizer loss indicated, but the effect of this plasticizer loss on tensile strength and the elongation properties of the rubber is visually apparent. In fact, by judicious use of the graph, it is not overly difficult to formulate heat resistant compounds in which allowance can be made for the degradation of the physicals as a result of a predictable and controllable minimum plasticizer loss. Figure 7 gives tetrafunctional graphs for gelled castor oil in four types of synthetic rubber and illustrates the excellent heat resistance possible with a non-volatile type of plasticizer.

back wire for telephone installations in 1902. Manufacture of rubber covered wire was begun in 1909 to take care of automotive and household appliance requirements. Insulated wire is made by the continuous process as well as older conventional methods. One of the important contributions of the Belden Mfg. Co. is the unbreakable molded rubber plug connector which was developed in 1927 by H. H. Wermine. Since then more than 100 million of these plugs have been produced. Two other important Belden contributions are the complete cord set and cord strain release. The latter was also introduced in 1927.

The Diamond Wire & Cable Co., organized in 1905, started to manufacture insulated wire in 1921. The company manufactures both rubber and plastics covered wire. Rubber covered wire is made by the continuous process as well as by the pan and reel process.

L. F. Lamplough and E. G. Sturtevant, in 1926-27, at the Western Electric Co., developed the continuous process of vulcanizing insulated wire, which has completely revolutionized and speeded up production.

During the war natural rubber was almost entirely replaced by synthetic rubber, and but for a few exceptions, it did an outstanding job. Synthetic rubber is constantly being improved in uniformity and quality. Neoprene, Butyl, nitrile- and "Thiokol"-type rubbers have made a definite place for themselves and will continue to be used. The future of GR-S *versus* natural rubber is largely a question of economics, and the lowest-cost material will be used. The increased yield of rubber latex from trees which have been rested during the war leaves but little doubt that natural rubber can be produced as cheaply as before the war. Our government and the rubber industry should continue to support our synthetic rubber industry so that we will never again be without an adequate supply of rubber.

Acknowledgments

The author wishes to acknowledge the information furnished him by John P. Coe, and R. B. Calcutt, United States Rubber Co., B. W. Hubbard, K. Sidell, C. E. Frick, P. Zeigler, and O. Urech. He also acknowledges the help of his associates, F. J. Bayme, O. Steiner, and A. Forbes, in searching for pertinent data during the preparation of this paper.

Rubber Industry in Chicago

(*Continued from page 654*)

ucts to meet its own requirement. Soft rubber products have been added to the line as required.

The Richardson Co., Melrose Park, started manufacturing roofing materials in 1918. The manufacture of these products was gradually discontinued in favor of molding plastic materials. Since 1931 the company has been making hard rubber battery cases and other hard rubber products. Richardson is the largest manufacturer of battery boxes in this country.

Insulated Wire

The Chicago Insulated Wire Co. began the manufacture of weatherproof and other coated wire in 1892.

The American Insulated Wire & Cable Co. started operating in 1902 and by 1903 had a capacity for producing 500,000 pounds of weatherproof wire per month.

The Belden Mfg. Co. began manufacturing enameled

Outlook for Latex

(*Continued from page 662*)

ing for America's market.

2. Discontinue government buying, but continue usage control through allocations. This plan would also definitely stimulate latex production and shipment to the United States.

3. Terminate specification control as well as government purchasing and allocation. This plan would offer no more incentive than Plan 1, but probably would be undesirable because of the risk of discolating prices through severely unbalancing supply.

Adoption of either Plan 1 or 2 would enable U.S. buying to compare more favorably with competitive countries' procurements, currently at slightly higher prices and on a longer term basis, and would reflect producers' needs. Also it would enable our government to extricate itself from its operations in the field of the commercial buying and selling of latex.

EDITORIALS

Too Much Heat — Too Little Light!

WITH the new Congress now actually charged with the responsibility of deciding as soon as possible on a national policy for rubber, the activities during the last two or three months of some of the groups most concerned, i.e., rubber goods manufacturers, rubber traders, and agencies of the Federal government involved in the rubber program, have resulted in such a profusion of public statements that the situation has become one developing too much heat and too little light. The problems to be solved are extremely complex, the wrong decisions may have far-reaching effects on the future of the country and the industry, and time is of the essence, *but* it almost seems as though a moratorium should be declared by those who have already had their say, in order that certain other interested parties might have an opportunity to be heard.

In this connection it was recently pointed out to us by one of the members of India RUBBER WORLD's Editorial Advisory Board that there have been no official expressions of opinion from those societies and divisions of the various professional and scientific societies whose members contributed so much to the development, design, construction, and operation of the American synthetic rubber industry and who have been and will continue to be required to use to best advantage the synthetic, natural, and reclaimed rubber of the future, no matter from what sources it is available and in whatever amounts it is supplied to them. Foremost among these societies and divisions that should make a decision on their position with regard to a national rubber policy and then make certain that this position is presented to the right members of the Congress, as well as the general public, is the Division of Rubber Chemistry of the American Chemical Society. This organization with a membership of more than 1,600 persons might be considered as supplying the major part of the technical personnel so important to the successful operation of the plants and laboratories of the industry.

Other organizations from which a statement of position on the national rubber policy should also be forthcoming are the American Society for Testing Materials, whose committees on rubber and plastics include several hundred technical men of these industries; the Rubber and Plastics Division of the American Society of Mechanical Engineers, the Division of High Polymer Physics of the American Physical Society, and the American Institute of Chemical Engineers; all of whose memberships contain many technical men important to the rubber and the plastics industries.

It is not only the right, but the duty of all of these organizations to see that their voice is added to the voices of the rubber manufacturers, the rubber traders, and the government agencies concerned with rubber so that the Congress may have as many expressions of opinion as possible from as many different sources as possible to aid it in formulating the best rubber policy for all concerned. As a member of most of the above-mentioned societies, your editor has written to them suggesting a prompt declaration of policy on rubber and would urge all readers of India RUBBER WORLD who are members of any or all of these organizations to do likewise.

The more light that can be directed toward the examination of the various proposals for our national policy on rubber, the better the final policy should be.

"A Milestone in Labor Relations?"

THE first company-wide management-labor contract in the rubber industry on working conditions was announced on January 27 by the United States Rubber Co. and the United Rubber, Cork, Linoleum and Plastic Workers of America, CIO. The new contract, which will become effective when supplementary agreements are executed in the various local plants of the company and which will run until July 1, 1948, does not include any new agreement on wage rates.

Union security is guaranteed by the company in agreeing to check-off of initiation fees, monthly dues, rejoining fees, and general assessments, and company security is guaranteed in certain clauses of the contract, portions of which are particularly noteworthy:

"The Union realizes the necessity of encouraging full productivity commensurate with fair labor practices and agrees that it will cooperate with all levels of supervision in discouraging any practice which imposes any unreasonable restriction on production and it further agrees that it will support management in its effort to improve production, establish efficient methods, eliminate waste in production, conserve materials and supplies, improve quality of workmanship, and strengthen good will between the Company, the employes, the consumers, the Union and the public.

"The Union agrees that it will not encourage, sanction, or approve any strike, stoppage, slowdown, or other interruption of work growing out of any dispute which is subject to the grievance procedure under the terms of this agreement and the supplements thereto. On the contrary, the Union will actively discourage and take whatever steps are necessary to prevent any strike, stoppage, slowdown or other interruption of work . . . Any strike, stoppage, slowdown or other interruption of work . . . may result in discipline by the Company."

The eyes of the industry and the nation will be upon this company and this union during the course of this contract since, if it proves mutually satisfactory, it may mark the beginning of a new era of better understanding in the rubber industry.

Scientific and Technical Activities

CPA Consulting Technical Committee Meetings

THE Rubber Division of the Civilian Production Administration (now a section of the new Office of Temporary Controls) has about 26 technical consulting committees[1] which have held meetings two or three times a year to discuss problems connected with the manufacture of specific rubber products. Lately certain of the technical personnel of the Office of Rubber Reserve have been requested to attend these meetings for the primary purpose of answering questions relating to the use of synthetic rubbers. That part of the CPA meeting attended by the Office of Rubber Reserve personnel has been devoted entirely to the problems which the rubber manufacturers are having with synthetic rubber with respect to product quality and manufacturing difficulties.

At the suggestion of E. W. Glen and A. R. Miller, of the CPA Rubber Division, and with the approval of the management of Office of Rubber Reserve, the minutes of that part of these meetings dealing with the characteristics of synthetic rubbers that are not so satisfactory as desired and the recommendations of Office of Rubber Reserve for the use of special GR-S types that show promise of being better than standard GR-S for the special needs of each rubber goods manufacturing group, will be published in India RUBBER WORLD from time to time. The publication of these minutes should be of substantial help to others in the industry who were not in attendance at the meetings and to all who would benefit from such information.

Coated and Combined Fabrics December 12 Meeting

A meeting of the Coated and Combined Fabrics Consulting Technical Committee was in the Social Security Bldg., Washington, D. C., on December 12. Government presiding officers were Mr. Miller and M. J. Tierney, of the ORR. The chairman of this CPA committee is Harold Nelson, United States Rubber Co.

The meeting was opened with a résumé of the Rubber Reserve program and facilities at the Government Evaluation Laboratories and Pilot Plant for the development of experimental and special-purpose GR-S polymers. It was emphasized that Rubber Reserve desires to aid, where possible, each section of the rubber goods manufacturing industry in overcoming its particular difficulties with synthetic rubbers by suggesting the use of available X-numbered GR-S polymers which may have certain advantages over standard GR-S, and, if desired, will follow through with the preparation of new experimental polymers.

In an open discussion the problems associated with the calendering and spreading technique for coating fabrics were considered. Non-staining and non-discoloring type GR-S was desired for practically all products of this sort. It was concluded that an ideal polymer for calendering operations would have the following characteristics: (1) low volatile matter (moisture); (2) equivalent to GR-S-25 in non-staining properties; (3) process as well as GR-S-60 (formerly X-285-GR-S); (4) equivalent to GR-S-50 in heat aging; (5) the adhesion to fabrics of a rosin soap polymer without sticking on mill and calender rolls; (6) rate of cure to be equal to natural rubber. In physical properties this "ideal polymer" should have a low modulus. Tensile strength, elongation, and hysteresis were not considered important factors for most of these uses.

Approximately 3000 pounds of an experimental pilot-plant copolymer, XP-60, which will approach this ideal, will be prepared at the Akron Government Laboratories for distribution to members of the committee in about 200-pound samples. Manufacturing conditions will be based upon GR-S-50 polymerization conditions with the following exceptions: (1) IBUL, a new-type non-staining stabilizer will be used; (2) a cross-linking agent will be used; (3) an emulsifier composed of two parts of fatty acid soap and three parts of rosin acid soap will be used.

For immediate investigations it was suggested that properties approaching the ideal polymer might be obtained with blends such as (1) X-273 and X-344; (2) GR-S-50 and X-344; (3) GR-S-25 and X-344; (4) GR-S-50 and GR-S-25 or X-273.

The committee suggested that it was believed that the staining properties of a rubber compound decreased exponentially with a linear reduction in antioxidant. This would suggest that improved properties could be obtained by blending GR-S-50 with GR-S-25 or X-273, which combinations would have superior resistance to staining than that produced with GR-S-50 and better aging properties than exhibited by GR-S-25 or X-273. X-273 would also increase the tackiness of the stocks. X-344 in blends with GR-S-50 should improve processing, staining characteristics, and heat aging, as well as increasing the rate of cure.

It was pointed out that the properties of blends of GR-S and natural rubber could be improved by compounding each rubber separately to give equivalent plasticates and rates of cure and then blending the same just before the final *processing step*. 50-50 blends of natural rubber and GR-S-50 were reported to be considerably better than all-rubber compounds in aging and non-staining properties as determined in a fadeometer and in evening out the large variability in rate of cure of the natural rubber now obtainable. Non-reverting natural rubber stocks may be compounded by using 25 parts GR-S to 75 parts rubber with proper acceleration.

Some preference for GR-S-50 to natural rubber for hospital sheeting was indicated by service performance. It was also stated that, generally speaking, GR-S-50 compounds were about 2½ times better than similar natural rubber compounds in 250° F. heat aging tests. Recent difficulties in dispersion of mineral fillers in GR-S-50 were attributed to moisture in the polymer.

The committee pointed out that at the same viscosity GR-S spreading dough could be made in higher concentrations than natural rubber. Except for its staining properties, GR-S-85 was considered to be very satisfactory for spreading compounds. XP-61, a non-staining variation of GR-S-85, will also be prepared at the Akron Government Laboratories with IBUL as a stabilizer and an emulsifier composed of two parts fatty acid soap and three parts rosin acid soap. Approximately 800 pounds of this polymer will be prepared for distribution through the committee chairman.

Non-staining type spreading doughs using X-272 or X-304 were suggested for investigation. Both are 100 Mooney rosin polymers stabilized with Stalite. The former has a normal monomer ratio and exhibits exceptional water resistance and electrical properties. X-304 is a high styrene copolymer which has a higher freeze point than standard monomer ratio polymers.

The committee did not comment on the use of GR-I for coating fabrics. However the very successful experience in military products in the past few years and its ready availability at this time would suggest development of GR-I for civilian products of this type.

Rubber Toy December 19 Meeting

The Rubber Toy Consulting Technical Committee held a meeting at the Social Security Bldg. in Washington on December 19. Government presiding officers were Mr. Miller and L. A. Woerner, of the ORR. The president of this technical committee is E. C. Brueggeman, of Seiberling Latex Products Co.

Soon after the meeting was opened it became apparent that several of the companies represented had not been manufacturing rubber toys during the war, but had produced other rubber products using similar methods of manufacture. The remainder of the committee indicated that toy production using the available synthetic rubber had been continued in their plants during the war. Under these conditions a limited amount of development work had been done in seeking improved products by utilizing the various special-purpose and experimental polymers now available.

The committee concurred that it desired an improved low-shrinkage, tacky GR-S. There were also requests for a better processing polymer for chemically blown sponge rubber, and for a GR-S latex which could be blended satisfactorily with natural rubber latices.

The first of the above desires of the committee to be discussed was the tacky, low-shrinkage polymer which would be expected to have superior calendering and milling characteristics. The following properties given in their relative order of importance seem to present the more desirable characteristics: (1) more bounce or rebound (resilience); (2) improved tack and bonding strength and longer tack retention; (3) low shrinkage; (4) non-discoloring; (5) non-blooming; (6) improved hot tear resistance; (7) non-toxic (GR-S is not known to be toxic).

To approach this standard, GR-S-60 (formerly X-285-GR-S) and its non-staining variation, X-344-GR-S, were suggested as improved processing and low shrinkage polymers. These were not recommended, however, for chemically blown sponge applications. In addition, the committee was advised that a superior processing polymer, XP-60, is being made up at the Government Laboratories in Akron as a tackier variation of X-344-GR-S. (See description under minutes of Coated Fabrics Commit-

[1] See India RUBBER WORLD, Mar. 1946, p. 834.

tee Meeting.) Samples of XP-60 will be forwarded to committee members as soon as available. These polymers are faster curing than standard GR-S. X-344-GR-S and XP-60 are expected to be faster curing than GR-S-60.

For rubber toys utilizing chemically blown sponge, XP-59 was recommended. XP-59 is a low Mooney, tertiary mercaptan modified polymer designed to eliminate excessive breakdown and was developed for the Chemically Blown Sponge Rubber Consulting Technical Committee as an improved processing GR-S. One report that was received from the latter committee indicates encouraging results for this pilot-plant polymer.

Work is now under way in the Rubber Reserve program on the development of a polymerization system for improved GR-S-type latices in which no emulsifier is used. When samples are available, the committee will be so advised. It is expected that this system will best approach the following conditions which the committee felt were most desirable: (1) low emulsifier; (2) large particle size similar to Type V Latex; (3) high concentration, 60% if possible; (4) relatively stable; (5) good elongation in films.

The committee was advised by the Office of Temporary Controls that appeals for natural rubber latex would be considered for development work on blends with synthetic latices. It was suggested that in work on blends a careful study should be given to stability as some stabilizers used in natural rubber latices appear to be incompatible in many instances with those of synthetic latices. Thus care should be taken in choosing compatible stabilizers for best results in blending.

The committee indicated that GR-M is being used on inflated-type products. Fairly good adhesion is thereby obtained although seaming properties are sometimes variable. When GR-M is used, greater processing costs are encountered, and it is not possible to make products in light colors. It is often necessary to lacquer balls to get desired colors and finishes. The oil resistant synthetic rubbers give most trouble in adherence of lacquers to the product. GR-M balloons are more difficult initially to inflate although they will hold air longer than natural rubber balloons. They also tend to stiffen when shipped during cool weather.

Leather Shoe Manufacturers December 18 Meeting

A meeting of the Leather Shoe Manufacturers Consulting Technical Committee was also held in the Social Security Bldg. on December 18. Government presiding officers were Mr. Miller and L. A. Woerner, of the ORR. The chairman of the OTC committee is G. B. Britton, International Shoe Co.

It was reported by the committee that the leather shoe manufacturers used rubber in the form of adhesives at the rate of 8½ pounds (solids) per 1000 shoes prewar and seven pounds (solids) per 1000 shoes during the period of maximum restrictions. Of this quantity approximately two-thirds is procured as latex and one-third as solvent cements. This ratio is determined primarily by the types of equipment available. Practically all of these latices and cements are compounded as non-curing adhesives. Owing to its low film strength very little GR-S is being used in these applications. GR-M forms the bulk of the synthetic rubber consumed. It was also pointed out that a large percentage of the adhesives procured has to be obtained several months ahead of actual application.

The properties of natural rubber films whether applied from latex or solvent cement, which were missed the most during the period when consumption of all synthetic rubber was necessary include the following:

1. Tack and Tack Retention. The initial tack of GR-M latex cements is excellent, but it is followed by a rapid decline with time which reduces its efficiency under normal operating conditions. The use of resins to increase the tack in GR-M results in reduced film strength. GR-S shows deficiencies in both properties.

2. High Film Strength. GR-M is commonly used because it has this property of high film strength. At the present state of development, GR-S latex cement exhibits very low film strength.

3. Easy Removal of "Roll-off" from Equipment and Hands. The lack of this property slows production in keeping equipment clean and results in dermatitis in many cases when the film is removed from the hands. In the case of GR-S and GR-M this condition is caused by the method of removal, i.e., repeated use of solvents and strong soaps. The large quantity of caustic or basic chemicals used in GR-M latices as stabilizers and possible other toxic materials incorporated therein tend to result in dermatitis. Natural rubber rubbed off quite readily.

Other factors which the committee felt contributed to the manufacturing difficulties encountered when synthetics were used included staining of non-rubber components of the shoe, the slow drying of synthetic latex films, the variable stability of solvent cements, and the separation of blends of synthetic and natural rubber latex adhesives after standing for relatively short periods.

In consideration of the roll-off problem, it would appear that GR-S with low film strength and GR-M, in spite of its high film strength, show greater adhesiveness than cohesiveness. In natural rubber these properties appear to be reversed, resulting in easy "roll-off." In a direct comparison of naural rubber and GR-M, both of which have a comparable high film strength, there are indications that GR-M after application has considerably better adhesiveness than natural rubber. This point is illustrated by direct comparisons in many applications where GR-M adhesives are superior in strip back adhesion. It was stated that although GR-S is not very important in the overall picture for these applications, it could be satisfactorily consumed for low film strength uses if it could be removed from the hands more readily.

One committee member stated that GR-M latex could be compounded to produce tack which would last for one week. In his opinion the trouble with GR-M is that it is too stable and that quick drying could be obtained by destabilization; pressure agitation is one method by which this might be accomplished. In some cases the films from these cements were suitable for use while still wet. He felt that too much emphasis was being placed on getting back to natural rubber latex rather than thoroughly trying out the synthetic latices.

Gelling of GR-M cements is sometimes caused by the resins used in compounding. The ideal resin would give a stable cement. Care must also be exercised in avoiding metallic containers which include lead in the inside coating or in high phosphorous glass containers, both of which are known to cause gelling.

The committee was unanimous in agreeing that separation occurs upon shipping when both GR-S and GR-M solvent cements and latices are blended in natural rubber cements or latex. These blends are often satisfactory when used within two days. This might be anticipated if the blends were made with natural rubber latex stabilized with a protein material such as casein which may be non-compatible with the stabilization system used in the synthetic latices. It would appear desirable to compound natural rubber latex for blends with stabilizers which will not tend to coagulate or cream or form unstable blends with the synthetic rubber latices.

Properties agreed upon which would result in definite improvement in GR-S latices are: (1) large particle size; (2) as high a concentration as possible with the goal at 60% solids; (3) improved tack and tack retention; (4) higher film strength, obtainable now only by high Mooney and high conversion; (5) to dry with transparent color and be non-staining; (6) faster drying; (7) more compatible in blends with natural rubber.

It was indicated that high styrene content seemed undesirable in attempting to develop a film with more legs, at least using the present emulsifiers. It was felt that less emulsifier and one of a different type using a lower styrene content might produce the desired results.

Present specifications for the development of improved GR-S latices now require larger particle size. Large particle-size latices in high concentrations are desired because they are more fluid (lower viscosity) than smaller particle-size latices in the same concentrations. The particle size of natural rubber latex is considerably larger than the standard GR-S latices (Types I, II, III and IV). Because synthetic latices have been described as slower-drying than the natural rubber latices, it is speculated that particle size also may be the factor controlling this condition since the soaps used as emulsifying agents in GR-S latices would lower the surface tension and speed up the drying time of the GR-S film. There is also some indication that the poor stability of blends of natural and GR-S latices may be caused by the fact that the smaller particle-size synthetic rubber latex may tend to steal the emulsifier away on a polymerization system reproducing an unstable condition.

Research and development work is now under way on a polymerization system requiring no emulsifier. This project is being accelerated, and pilot-plant samples are expected in the near future. When these are available, the committee members will be advised, and samples made available for their evaluation.

The preparation and use of GR-M and GR-S cements have been found to be more expensive than natural rubber. GR-M, being considerably more solvent resistant than either natural rubber or GR-S, requires additional processing to put it into solution. The low film strength of GR-S necessitates the use of thicker coats of cement to obtain satisfactory strength. In addition higher concentration of solids is required than for natural rubber to give a similar viscosity. These factors all contribute to the higher costs. GR-S is in some cases more soluble than natural rubber.

It is to be noted that according to the Rubber Division of Civilian Production Administration the dry rubber solvent cement pattern has been for some time established in accordance with the long-term recommendations of the Inter-Agency Policy Committee on Rubber (Batt), i.e., to use one-third synthetic to the total of natural plus synthetics and that to date this pattern has been operating satisfactorily.

SAE Hears Rubber Progress Report

THE Society of Automotive Engineers held its annual meeting at the Book-Cadillac Hotel, Detroit, Mich., January 6 to 10. Of special interest among the many papers presented at the meeting were the paper on "Rubber—Will We Make It or Take a Chance," by J. E. Hale, chief engineer of the tire division, Firestone Tire & Rubber Co., and the paper on "Automotive Cements and Sealers," by Allan J. Carter, project engineer on plastics, cements, and sealers of the Chrysler Corp.

Synthetic *vs.* Natural Rubber Tires

In the introduction to his paper Mr. Hale acknowledged that a review and evaluation of the synthetic rubber industry would necessitate the inclusion of some fairly well-known material, but he had selected the subject matter in an attempt to clarify existing questions. After a brief review of the synthetic rubbers, he gave a quality comparison of synthetic *versus* natural rubber tires. From mid-1943 to the end of 1946, production of synthetic tires in the United States was roughly as follows: passenger tires, 100,000,000; truck-bus tires, 60,000,000; farm tires, 10,000,000; synthetic inner tubes, about parallel to casing production; and, in addition, some 90,000,000 passenger, truck, and farm tires were recapped with synthetic camelback. In comparing the durability characteristics of GR-S and natural rubber tires, the speaker made the following points: (1) the wear resistance of GR-S is less than that of natural; (2) flexing life is about equal, but GR-S is superior in resistance to radial cracking and curb blistering of sidewalls; (3) the resistance of GR-S to tearing, cuts, and cracks in service is inferior to natural; (4) aging and weathering qualities are about equal, as are resistance to solvents and greases; and (5) the adhesive qualities of different laminations of GR-S stock are inferior to natural rubber. In comparing function characteristics, Mr. Hale stated that GR-S has a higher hysteresis than natural rubber, a somewhat higher modulus, and approximately equal elongation and permanent set.

Discussing service experiences during the past three years with synthetic rubber passenger tires, Mr. Hale stated that pretty good tread wear life has been obtained. Carefully supervised road test results show that tire mileages about 10-20% below that of corresponding natural rubber tires are obtained. In general there is no deficiency of body strength of GR-S tires; however, this point is qualified by the higher heat build-up under hot weather driving conditions. The speaker also mentioned the effect of the rubber used in passenger-car tires on fuel economy of the car. Under average driving conditions the car equipped with S-3 (GR-S) tires will consume about 6% more fuel than with natural rubber tires. Lower efficiency tires also adversely affect acceleration to a noticeable degree in hill climbing.

Discussing the S-6 (67% GR-S, 33% natural rubber) truck tire, the Firestone engineer declared that its tread wear life was only about 60-70% that of a natural rubber tread. The major problem encountered was tread and ply separation, and the natural rubber content was used to combat this separation. When used in earthmover tires for off-the-road service, the S-6 stock was not particularly satisfactory because of ply separation and cracking and snagging of the tread.

Early synthetic rubber tires were made of GR-S before the change to Butyl. Butyl tubes also have certain disadvantages. They stiffen up in cold weather and may develop folds in the crown of under-inflated tires because of sluggish recovery as the tire flexes. These folds eventually develop into creases with holes in them. Other unfavorable factors are their tendencies to develop fatigue cracks at the toe of the bead and to take a permanent set.

Speaking of synthetic rubber tire use in the immediate future, on the basis of government-industry committee reports, Mr. Hale gave the approximate compositions of the rubbers to be used in different types of tires. For 6.50-size passenger tires, he indicated use of both S-9 (77% GR-S, 23% natural) and S-7 (33% GR-S, 67% natural). Passenger-car tires of 6.00 and smaller sizes will use S-9; while the 7.00 and larger sizes will use S-7. Small-size truck tires will use both S-7 and S-11 (6% GR-S, 94% natural); while the medium and larger sizes will use only S-11. Farm tires will employ S-4 (87% GR-S, 13% natural); while earthmover and all airplane tires will use S-11.

In conclusion, Mr. Hale expressed his belief that the automotive industry should be among the foremost to support and collaborate in a continuous development program on synthetic rubbers. Not only is it desirable to get low basic costs with proper quality, but it is necessary to get the production of synthetic rubber under American commercial control to avoid the enormous fluctuations in price encountered by the rubber industry over the years. The speaker advocated a free market for natural and synthetic rubbers to permit competitive influences for low price and high quality to settle conditions gradually so that only the more efficient producers of the various rubbers could continue in the field. There is still a big job to be done to settle once and for all the problem of taking rubber off the strategic materials list, and the interests of our future national security demand that we finish the job.

Automotive Cements

In his paper Mr. Carter stated that the continual advancements in sealers and cements and their methods of application have made possible the elimination of drafts, dust, wind noise, and weather effects from the passenger-car interior, in addition to improvements in appearance and styling. He reviewed the compositions, properties and methods of application of the sealers used for car underbodies, roof drip moldings, spot welding seams, body section openings, windshield weather strips, and gaskets and threads. The speaker gave similar discussions of the cements used for attaching sponge rubber weather strips to doors, upholstery trims, headlinings, body insulation materials, body shims, and cork gaskets. Although the past performances of our cements and sealers have been satisfactory, Mr. Carter stated, the future shows considerable promise. New resins and rubber polymers will surely be developed with properties designed to make superior cements and sealers. These cements will have very high initial and final bonding values, superior aging properties, rapid drying rates, long bonding rates, and high heat resistance. The sealers will have outstanding adhesive and aging properties. Superior properties of this nature will also permit a reduction in the number of specific cements required for automotive construction.

A.S.T.M. Meetings

A.S.T.M. Committee Week to be held in Philadelphia, Pa., at the Benjamin Franklin Hotel during the week of February 24, has scheduled meetings of Committee D-11 on Rubber and Rubber-Like Materials, Committee D-9 on Electrical Insulating Materials, and Committee E-11 on Quality Control of Materials.

A symposium on paint and paint materials will take place February 25, under the sponsorship of Committee D-1 on Paint, Varnish, Lacquer, and Related Products.

The Philadelphia District Council is sponsoring a Dedication Dinner on the evening of February 26, in connection with the formal dedication of the new society headquarters. A number of dignitaries will be present at the dinner, and some nationally prominent industrialist or engineering leader will give the main address.

Subcommittee meetings of D-11 are scheduled for the morning and afternoon of February 26 and the morning of February 27, with the meeting of the full committee scheduled for the afternoon of February 27. Subcommittee and section meetings of D-9 are listed for the morning and afternoon of February 27 and the morning of February 28, with the meeting of the full committee planned for the afternoon of February 28. Committee E-11 will meet on the morning of February 25, and a meeting of the advisory committee will be held in the evening.

Committee D-20 on Plastics and its subcommittees will meet on March 3, 4, and 5, 1947, at the Netherlands-Plaza Hotel, Cincinnati, O. This meeting will be featured by a plastic symposium. The following papers will be presented:

TUESDAY EVENING, MARCH 4

"Permanence of Plastics," by G. M. Kline, National Bureau of Standards.

"Flammability of Plastics," M. M. Braidech, National Board of Fire Underwriters.

"The Electrical Properties of Plastics," A. J. Warner, Federal Telecommunications Laboratories.

"The Effects of Fungus and Moisture on Plastics," J. Leutritz, Jr., Bell Telephone Laboratories, Inc.

WEDNESDAY AFTERNOON, MARCH 5

"Low-Pressure Phenolic Laminates," T. W. Noble, Fabricon Products Corp.

"The Mechanism of Plasticization in Plastics," J. K. Craver, Monsanto Chemical Co.

"Use of Plastic Materials in Optics," H. R. Moulton, American Optical Co.

Carpenter Discusses Rubber Progress

A paper on "Progress in Rubber," by Arthur W. Carpenter, manager of The B. F. Goodrich Co. testing laboratories, and president of the American Society for Testing Materials, was given at meetings sponsored by the Cleveland and Pittsburgh A.S.T.M. districts on November 7 and December 2, respectively. The paper was also presented at a joint meeting of the Chicago A.S.T.M. district and the Chemical & Metallurgical Section of the Western Society of Engineers on January 7 and is being reprinted in the January issue of the *ASTM Bulletin*.

Mr. Carpenter's paper was in the nature of a general review of rubber progress. After an introduction describing the work of A.S.T.M. Committee D-11 and its subcommittees on standardization of test methods, he discussed the prewar history of natural rubber. The growth of plantation rubber was described, together with data

on price fluctuations and consumption of natural rubber, particularly by the United States. Turning to synthetic rubber, the speaker briefly described prewar developments of synthetic rubbers in this country and then reviewed the wartime role of the synthetic rubber industry. In this connection he noted that investigation of the records of I. G. Farbenindustrie of Germany have revealed reports from technical experts to high officials assuring them that the American synthetic rubber program then being planned was impossbile to accomplish. Discussing the relative merits of natural and synthetic rubbers, he stated that while approximately equivalent for most applications, each type of rubber possesses certain advantages in some specific uses. Mr. Carpenter concluded his talk with a discussion of the postwar role of rubber, including the relation between natural and synthetic rubbers in production, consumption, and price levels. He noted that while synthetic rubber could be made at about 11¢ a pound, it would probably stabilize at a price of about 15¢ a pound in a free market. On the other hand, it has been estimated that natural plantation rubbers could be sold profitably at about 8¢ per pound. A regulatory program is therefore necessary to include also considerations of national security, and the speaker urged the speedy establishment of a national rubber policy.

New Color Dispersions and Plastics Coloring Materials

POLY-TINT aqueous color dispersions were recently announced by Wilmington Chemical Corp. They are true dispersions of pigments, in liquid form, for the coloring of latices and aqueous dispersions of natural and synthetic rubbers, polyvinyl chloride, polyvinylidene chloride, and similar materials. The dispersions are highly fluid, and the pigments used are lightfast and stable.

Use of these colors is extremely simple; no grinding or other preliminary treatment is necessary. The required amount of Poly-Tint is added directly to the latex or emulsion with simple agitation. Poly-Tint dispersions are now available in four basic colors: 800A-Red, 810A-Blue, 820A-Yellow, and 830A-Black. These colors can be used to produce practically any other shade.

Poly-Tint plastics stains have also been developed by Wilmington Chemical Corp. for the coloring of various plastics by dipping methods. Two types of these stains are presently available. The first type, the 600 Series, is designed for coloring cellulose acetate, cellulose acetate butyrate, ethyl cellulose, polyvinyl chloride, and similar materials, and consists of the following colors: 600A-Red, 610A-Blue, 620A-Yellow, and 630A-Black. The second type, the 700 Series, is designed for coloring methyl methacrylate and polystyrene, and consists of the following colors: 700A-Red, 710A-Blue, 720A-Yellow, and 730A-Black. The stains are completely compatible with one another and can be blended to produce other desired colors.

In use, the staining time can best be determined by simple experimentation on the plastic to be dyed. Average dipping time to obtain the usual color depth requirement is from 30-50 seconds. However the stains have been designed to give minimum color change between 30-50 seconds' dip time so as to allow considerable operation variation. When shorter dip times are required, the stains can be easily controlled and constant results obtained. After dipping, the stained articles are given a water wash to set the color and remove superficial or unset color. The wash can be of very short duration as the action here is virtually instantaneous. Of course, the stain solution acts on the plastic until it has reached the wash, and this time should be included in the overall dip time. After washing, drying may be carried out by any desired method.

Poly-Tint stains are designed for use at normal room temperature and should not be used above 110° F. Color intensity increases with the temperature, and, to insure uniform color, the temperature should be maintained as near constant as possible. In addition the stains should not be stored at temperatures below freezing.

Philadelphia Group Elections

SOME 120 members and guests of the Philadelphia Rubber Group attended a meeting on January 10 at Kugler's Restaurant, Philadelphia, Pa. Election of officers for 1947 took place, and the following officers were chosen: chairman, L. K. Youse, of L. H. Gilmer Co.; vice chairman, William B. Dunlap, Jr., of Lee Rubber and Tire Corp.; treasurer, T. T. MacConnell, of U. S. Rubber Reclaiming Co., Inc.; and secretary, William F Abbey, of Firestone Tire & Rubber Co. The following directors were also chosen: three-year term, F. M. Galloway, of Quaker Rubber Co.; two-year terms, William Ayscue, of E. I. du Pont de Nemours & Co., Inc., and D. E. Handerson, of Associated Rubber Products; and one-year term, Ralph Davis, of MacEwan & Smith. Still to be appointed are directors for a three- and a one-year term, respectively.

Guest speaker at the meeting was T. L. Williams, of du Pont's rayon division, whose topic was "The Prospects and Use of Rayon." Dr. Williams stated that viscose rayon is simply cellulose arranged in the convenient form of long fibers and that the properties of the fibers are determined by the complete history of the cellulose, both chemical and physical. By altering this history, the important properties such as luster, dyeing, water absorption, strength, elongation, and fatigue resistance can be varied individually over wide ranges. This sensisitivity to history gives the rayon manufacturer an opportunity to accentuate the desired properties and to make a very uniform product. It also imposes an obligation to control all processes carefully, an obligation which extends to those who make finished products from viscose yarns. The types of rayon now used in the reinforcing cords of automobile tires are replacing cotton because of their high strength per unit of weight or size and their resistance to heat and flexing. These same advantages are available in reinforcing many other products, and sometimes with more dramatic results. As yarns for braiding into hose, cords for V-belts, and as fabrics for diaphragms, hose, transmission and conveyer belting, high-tenacity viscose rayon is showing remarkable promise, Dr. Williams stated. In some cases its high strength in low gage gives properties which cannot be achieved with any weight of cotton. In others, savings in weight of fiber and elastomer result in important economies.

Rubber Division Meeting

THE 1947 spring meeting of the Division of Rubber Chemistry, American Chemical Society, will be held at Cleveland, O., on May 26 to 28, with headquarters at the Hotel Cleveland. This will not be a joint meeting with the parent society as the latter meets April 14 to 18 at Atlantic City, N. J.

Because of the central location of Cleveland, an unusually large attendance is expected of the younger chemists and compounders who seldom attend the meetings. As in the past, papers on some phase of natural or synthetic rubber technology are invited. Authors of papers are requested to submit an abstract, in triplicate, of 200-250 words describing the paper, giving the laboratory in which the work was done, the author's business connection, and the time required for presentation of the paper. These abstracts should be in the hands of the divisional secretary, C. R. Haynes, Binney & Smith Co., 41 E. 42nd St., New York 17, N. Y., before March 31. To insure prompt publication of the paper, three copies should be available for the secretary at the time of the meeting.

Local arrangements for the meeting are being handled by a committee headed by Allyn I. Brandt, with C. A. Smith as vice chairman in charge of housing arrangements. The customary divisional banquet is planned for the evening of May 27. As previously mentioned, the headquarters hotel will be the Cleveland, but rooms will also be available at the Statler, Hollenden, and Carter hotels. All reservations should be addressed to the Hotel Cleveland, Public Square and Superior Ave., with the desired hotel specified in the letter. After the allotted number of rooms at the Cleveland are taken, other reservations will be distributed by the Cleveland Conventional Bureau among the other three listed hotels.

Other A.C.S. Sessions

A High Polymer Forum, sponsored jointly by the Rubber Division and several other A.C.S. divisions, is scheduled for the Atlantic City meeting and will probably be held on April 15 and 16. The Division of Paint, Varnish and Plastics Chemistry of the A.C.S. will also meet with the Society in Atlantic City. General divisional meetings will be held, probably on April 17 and 18, and there will be a symposium on the colloid chemistry of inorganic pigments, sponsored jointly with the Colloid Division, probably on April 16.

Bibliography of Government Rubber Program Papers

THE Office of Rubber Reserve, RFC, issued last month a bibliography of technical papers relating to the Government synthetic rubber program, which had appeared in the technical journals up to November 1, 1946. In accordance with a general policy of making public much of the technical information acquired from research work sponsored by the government agencies, the various laboratories cooperating with Rubber Reserve have been publishing some of their work on synthetic rubber research. The bibliography contains 131 publications, as compiled from lists submitted by the cooperating university and company laboratories. It is expected that the bibliography will be brought to date at suitable intervals.

Chicago Group Party

MORE than 600 members and guests attended the annual Christmas Party of the Chicago Rubber Group on December 20 at the Morrison Hotel, Chicago, Ill. The turkey dinner was preceded by a cocktail hour and followed by a two-hour floor show of outstanding night-club acts from the Chicago area. Koroseal parasols, presented to the ladies, were enthusiastically received.

Door prizes furnished by the following companies were distributed: a Philco console radio Phonograph, from the Group itself; four Allstate tires, from Sears Roebuck & Co.; two Riverside tires, from Montgomery Ward & Co.; two Inland tires, from Inland Rubber Corp.; two pairs of shoes, from Florsheim Shoe Co.; a Mixmaster, from Witco Chemical Co.; a Toastmaster, from the Group itself; a portable radio, from Herron Bros. & Meyer; a coupon book, from Shell Oil Co.; rubber leashes, from Cordage, Inc.; and basketball shoes, from Servus Rubber Co.

The committee in charge of arrangements for the party consisted of Chairman J. Frank Taylor, Co-chairman Ralph Anshuetz, Joe Zak, James P. Sheridan, Herbert F. Schwarz, Vincent Labrecht, and Alfred Stein.

The next meeting of the group will be held February 14 at the Morrison Hotel. Guest speakers will be E. L. Stangor and Charles J. Mighton, both of the Akron rubber laboratory of E. I. du Pont de Nemours & Co., Inc. Mr. Stangor will speak on "Backrinding of Molded Products," and Dr. Mighton will discuss "New Outlets for Rubber through Latex." In addition to the speakers, motion pictures will be shown of some of the past season's outstanding football games.

Tentative dates for future group meetings are March 21 and May 9.

Quebec Group Meetings

THE Quebec Rubber and Plastics Group held its second and third meetings of the current season on November 10 and December 12, respectively, at the Ritz-Carlton Hotel in Montreal, P. Q., Canada, with approximately 50 members attending each meeting.

The November meeting featured a talk on "Synthetic Rubbers, Plastics, and Fibers" by R. V. V. Nicholls, lecturer in organic chemistry at McGill University. Dr. Nicholls outlined in non-technical terms the basic structural differences which explain the mechanical properties of synthetic rubbers, plastics, and fibers. He emphasized the continuity of structural form which exists throughout these three arbitrary classifications. The importance of double bonds, chain length, cross-linking and substituent groups in controlling properties was also explained.

A talk on "Electronics in Industry and the Home," by Lt.-Col. A. R. Swinton, manager of the electronics apparatus division, R. C. A. Co. of Canada, featured the Group's December meeting. The speaker briefly reviewed the history and development of electronics, then outlined its manifold wartime and peacetime applications. Among the applications discussed were the radio teletype, radio frequency modulation, television, use of electronics in control work, sorting and counting, high-frequency molding of plastics, the electron microscope, and radio navigational aids.

It was announced that future meetings of the Group during the season will be held on the second Thursday of each month.

New Navy Specifications

FOUR new navy specifications have appeared since our previous listing in the January issue. Members of the rubber industry desiring copies of these specifications can obtain them upon request, giving title, number and date, from the Navy Department, Bureau of Supplies and Accounts, Washington 25, D. C.

Navy Dept. Spec. 33G8e — Gaskets, Asbestos-Metallic-Cover, Rubber-Core, dated 15 October 1946 (6 pages).

Navy Dept. Spec. 33H9c — Hose, Air, Diving-Apparatus; and Fittings, dated 15 November 1946 (9 pages).

Navy Dept. Spec. 33H31a — Hose, Gasoline, Synthetic Rubber, Wire-Stiffened, dated 15 October 1946 (14 pages).

Navy Dept. Spec. 33R12 — Rubber (Synthetic), Cellular, Chemical Blown and/or Expanded, dated 1 November 1946 (12 pages).

Akron Group Meeting

THE winter meeting of the Akron Rubber Group will be held on February 21, at the Mayflower Hotel, Akron, O. Speaker of the evening will be John L. Strohm, past president of the American Association of Agricultural Editors, who will speak on "The People behind the Iron Curtain." As his subject implies, Mr. Strohm's talk will be built around his experiences during a recent visit to the Soviet Union. He was the first correspondent in many years to travel freely throughout Russia and has brought back an uncensored story, illustrated with color pictures, of life in the Soviet.

Crossley A.I.C. Medalist

M. L. CROSSLEY, director of research, American Cyanamid Co., with headquarters at the Calco Chemical Division, Bound Brook, N. J., has been unanimously selected to receive the 1947 gold medal of the American Institute of Chemists. Foster D. Snell, president of the Institute, stated that the award is made in recognition of Dr. Crossley's activities in behalf of the chemical profession and his leadership in research leading to discoveries in the fields of dyes and pharmaceuticals. Presentation of the medal will be made at the annual meeting of the Institute, to be held in May.

Dr. Crossley has played a leading part in research on the relation of molecular structure to color in organic compounds; in the synthesis of dyes; in the discovery and industrial development of the sulfa drugs; in a fundamental study of the chemistry of infectious diseases, especially the changes in certain constituents of the blood in pneumonia; and in the chemotherapy of cancer. Born in the Dutch West Indies, Dr. Crossley received his degree from Brown University and has been research director of American Cyanamid since 1941.

Petroleum Institute Medalist

THE Cadman Memorial Medal for outstanding research in petroleum science has been awarded to Robert P. Russell, president of Standard Oil Development Co., it was announced on January 21 by the British Institute of Petroleum. The Cadman medal is awarded at least once every three years for scientific contributions in the field of petroleum. Mr. Russell will receive the medal on June 4, when he delivers the second Cadman Memorial Lecture in the Lecture Hall of the Royal Institution, London. He will speak on "Progress in Petroleum Research." The medal, first awarded in 1946 to Sir William Fraser, commemorates the great services to the petroleum industry of the late Lord Cadman.

In recognition of his outstanding services during the war, particularly in directing research and development in the field of flame throwers, incendiaries, and smoke generators, Mr. Russell recently was awarded the Medal for Merit, the highest civilian award in the United States. The American Institute of Chemists, recognizing his wartime achievement in directing the development of aircraft fuel, explosives, and synthetic rubber, recently awarded him the Institute's 1946 gold medal for "noteworthy and outstanding service to the science of industry."

Thomas A.C.S. President-Elect

CHARLES ALLEN THOMAS, vice president and technical director of Monsanto Chemical Co., and one of the key figures in the development of atomic energy, was elected president of the American Chemical Society for 1948. Dr. Thomas will serve as president-elect of the Society during 1947 and assume the presidency on January 1, 1948. During the war Dr. Thomas was one of the principal scientists in the development of the atomic bomb, having had charge of the final purification and metallurgy of plutonium, the 94th element. He became general director of the Clinton Laboratories at Oak Ridge, Tenn., on July 1, 1945, and, after the war, continued in charge of work to convert atomic energy to peacetime uses. He also played a leading wartime role in the development of catapult rockets for launching robombs. Born in Scott County, Ky., on February 15, 1900, Dr. Thomas graduated from Transylvania College and Massachusetts Institute of Technology. He joined Monsanto as central research director in 1936, was appointed technical director in September, 1945, and became a vice president on April 26, 1945.

Wartime Use of Ethyl Alcohol

DURING the period of January 1, 1943, to June 30, 1945, some 611,200,000 gallons of 190-proof industrial-grade ethyl alcohol were used by the synthetic rubber industry, according to a report from the Bureau of the Census, United States Department of Commerce. This figure represented 46.4% of total consumption of the alcohol during that time. From October 1, 1944, to June 30, 1945, 243,246,000 gallons of ethyl alcohol were allocated to synthetic rubber, and 6,996,000 gallons allocated for use in plastics and synthetic resins.

Additional Experimental GR-S and GR-S Latices

ADDITIONS to the list of experimental GR-S dry polymers and GR-S latices available for distribution to rubber goods manufacturers, from the Office of Rubber Reserve, RFC, under the conditions outlined in our November, 1945, issue page 237, have been received and are listed in the table which appears below:

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-347-GR-S	General, Baytown	12/26/46	Same as GR-S Black I except that Mooney viscosity of unpigmented polymer will be 30 ± 5.	The use of this type of carbon black masterbatch may eliminate one processing step, and the necessity of handling free pigments resulting in cleaner operation should show superior processing and handling characteristics with better dispersion of pigment. Owing to lower Mooney, quicker breakdown should be obtained with X-347 than with GR-S Black I. GR-S Black I is a mixture of 100 parts of a low viscosity GR-S and 50 ± 2 parts of EPC black.
X-353-GR-S	Copolymer, Baton Rouge	12/16/46	Activated GR-S polymerized at lower temperature to lower conversion, 50 Mooney.	Lower temperature necessary for an activated recipe during polymerization and lower conversion generally favor processing; 50 Mooney viscosity. This polymer will be used as control for X-354-GR-S in tire treads.
X-354-GR-S	Copolymer, Baton Rouge	12/16/46	Polymerized under same condition as X-353, but has a 90-100 Mooney viscosity.	Higher Mooney variation of X-353-GR-S is expected to produce wear in tires.
X-356-GR-S	U. S. Rubber, Institute	1/10/47	Black masterbatch with 100 parts of a polymer made with mixture of rosin acid and fatty acid soaps; 50 parts EPC black; 38 Mooney; 1.5 BLE.	Mixture of rosin acid and fatty acid soap expected to give better processing, i.e., rosin acid soap to provide better tack, and the fatty acid soap to reduce sticking to the mill. Similar to X-314-GR-S. Insufficient supply for general distribution.
X-357-GR-S	U. S. Rubber, Institute	1/10/47	GR-S-10 in SRF black masterbatch.	For use in carcass compounding. Insufficient quantity for general distribution.
X-358-GR-S Latex	U. S. Rubber, Naugatuck	1/8/47	Similar to X-239-GR-S latex except using a mixed wood rosin soap emulsification; normal solids content.	This latex differs from Type III in that it has a slightly lower styrene content and a Mooney range of 50-75.

Powdered Metallic Fillers

ROSSALOY powdered metallic minerals are available for use as fillers in plastics and rubber. The powders are furnished in screen sizes ranging from −10 to −20 and are chemically inert and resistant to most common chemicals and solvents. The material is available in two grades, Rossaloy Nos. 4 and 5, with a specific gravity range of 4.95-5.10. Rosaloy No. 4 is non-magnetic and reduces the electrical conductivity of the material into which it is compounded. Rossaloy No. 5 is magnetic and increases the electrical conductivity of the stock in which it is used. The No. 5 gives a black color to stocks; while No. 4 imparts a gold-like appearance, especially in transparent plastics.

The Rossaloys can be used in amounts ranging from 30 to 70% of the stock. They impart abrasion resistance to both natural and synthetic rubbers because of the hardness of their particles. They also improve hardness and dimensional stability in rubber. They retard cold flow and increase resistance to aging, heat, water, oil, flame, and low temperatures. They disperse readily in the stock and can be used for applications requiring service at temperatures as high as 850° F.

Synthetic Fibers Symposium

DEVELOPMENTS in synthetic fiber technology still in the test-tube stage were the topics of discussion at a symposium on "Resilience of Fibers and Fabrics." This was the fourth symposium in a series on "Recent Progress in the Field of High Polymers" held at the Polytechnic Institute of Brooklyn by the Institute of Polymer Research and was held on January 25. The symposium was under the chairmanship of Milton Harris, head of Milton Harris Associates, and consisted of the following papers: "Some Factors Related to Resiliency," by John Dillon, Textile Research Institute; "Mechanics of Resilience of Textile Materials," by Walter Hamburger, Fabric Research Laboratories; "Some Relationships between Resilience and Creasing and Mussing of Fabrics," by Lyman Fourt, Milton Harris Associates; and "Resilience of Pile Floor Coverings," by Oliver Beckwith and J. Barach, Alexander Smith & Sons.

According to H. F. Mark, head of Polytechnic's Institute of Polymer Research, resiliency is the chief property of natural fibers that has not yet been developed synthetically. To date, no synthetic filament which is as resilient as wool and as strong as rayon or nylon has been produced. He pointed out that the tenacity of nylon and its resistance to deterioration from repeated laundering excels that of natural fibers; while the luster and drape of certain rayon fibers are far better than that of silk or cotton. Other properties of synthetic filaments which improve on the natural are ability to take dyes and resistance against chemicals.

1946 Production of Thiurams

PRODUCTION statistics on tetramethylthiuram sulfides are included in a report from the United States Tariff Commission on production of certain synthetic organic chemicals from January to October, 1946. Production of tetramethylthiuram sulfides during that time is given below, except for June, July, and August, for which no figures are available.

Month	Pounds
January	222,788
February	216,085
March	348,773
April	269,391
May	393,720
September	348,779
October	148,258
Total:	1,947,794

CALENDAR

Feb. 4.	**Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.**
Feb. 13.	**Quebec Rubber & Plastics Group.**
Feb. 14.	**Chicago Rubber Group. Morrison Hotel, Chicago, Ill.**
Feb. 14.	**Connecticut Rubber Group. Winter Meeting. General Electric Co.'s Monogram Hall, Bridgeport, Conn.**
Feb. 20.	**Southern Ohio Rubber Group. Young Women's League, Dayton, O.**
Feb. 21.	**Akron Rubber Group. Mayflower Hotel, Akron, O.**
Mar. 2-5.	**American Society of Mechanical Engineers. Spring Meeting. Mayo Hotel, Tulsa, Okla.**
Mar. 4.	**Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.**
Mar. 10-12.	**Toy Fair. Hotel McAlpin, New York, N. Y.**
Mar. 13.	**Quebec Rubber & Plastics Group.**
Mar. 14.	**Boston Rubber Group. Spring Meeting. Hotel Somerset, Boston, Mass.**
Apr. 1.	**Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.**
Apr. 8-11.	**American Management Association. Conference on Packaging, Packing, and Shipping; and Packaging Exposition. Convention Hall, Philadelphia, Pa.**
Apr. 10.	**Quebec Rubber & Plastics Group.**
Apr. 11.	**New York Rubber Group, Hotel McAlpin, New York, N. Y.**
Apr. 14-18.	**American Chemical Society. Spring Meeting. Atlantic City, N. J.**
May 26-28.	**Division of Rubber Chemistry, A.C.S. Spring Meeting. Hotel Cleveland, Cleveland, O.**

Plastics Technology

Mechanical Precision in Molded Plastics Parts[1]

S. K. Moxness[2]

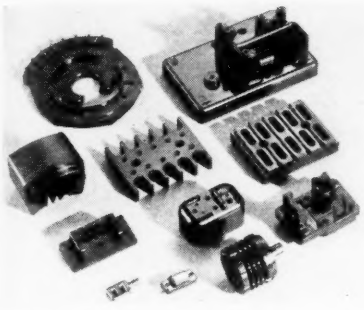


Fig. 1. Typical Parts Which Must Be Molded to Precision Tolerances

INDUSTRY today is turning more and more to the use of phenolic molded parts in the manufacture of all types of instruments. Whether the simplest thermostat or the most complicated control device, some of the most essential parts are often made from molded phenol-formaldehyde plastics. One obstacle to the greater use of phenolics has been the difficulty of holding the dimensional tolerances found practical in metals. For many years the custom molder did the molding for everybody using plastics in the manufacture of their products. His was a very competitive field; thus he was in no position to spend much time and money in research on methods of molding to close tolerances. While certain standards have been established for the plastics industry as practical tolerances for phenolics, it is felt that these tolerances are suitable only for average molding.

There is a small percentage of parts that falls into an other than average category. These are the parts used quite often in the manufacture of recording and controlling instruments. The design engineer knows that if he could hold certain tolerances on the plastic parts, he might be able to save a considerable amount in the cost of the instrument. This molding is the type that is to be discussed.

Precision molding is going to be a very important part of the plastics industry, and a great deal of research has been done on this subject during the past few years. Many large companies doing their own molding are demanding closer tolerances, but the advantages gained by this increased precision must be carefully balanced against the increased cost of the molded parts. It has already been proved that, when necessary, conventional tolerances of ±0.003 per inch can be cut to ±0.0015 per inch, and these dimensions maintained under normal conditions. (Figure 1.)

Factors Important in Precision Molding

Many elements enter into so-called precision molding. Strangely enough, the most important thing is that the designer permit as much tolerance as possible on all dimensions. He should use fractional dimensions wherever possible and insist on close tolerances only where they are absolutely necessary. Holding dimensions to ±0.0015 per inch on only a few dimensions is not too much trouble.

Of great importance also is that the mold be as close to specifications as a good moldmaker can make it. To have a 12-16-cavity mold made to all specified dimensions is not very easily done, even with tolerances of ±0.005-inch on mold drawings. Cut a few of these mold tolerances to ±0.002-inch, and the mold cost may readily double. Considering that some molds may have from 30 to 40 dimensions to hold to specifications in each cavity, one realizes that chances of getting correct dimensions on all cavities are very slim. Experience at Minneapolis-Honeywell has shown that very few multiple-cavity molds can be made to pass specifications on every dimension. For this reason molds with a smaller number of cavities are used wherever close tolerances on the parts are required. To make two or four cavities dimensionally correct is very possible. The molding cost goes up, of course, but this increase can usually be justified by the advantage of closer dimensions.

Another important factor is uniformity of bulk factor and moisture content of the molding powder, both throughout a batch and from batch to batch. Even when mold dimensions are correct and material uniform, it has been found that the density and dimensions of castings can be made to vary considerably, both in compression and transfer-type molds. Various other elements also enter into this type of molding, such as preheating of the molding powder, molding time and temperature, etc. Post-conditioning of molded parts is also being utilized when some extremely close dimension must be held and consists of after-baking the parts to accelerate the after-shrinkage.

Molding M4 and M10 Periscope Heads

To illustrate precision molding, consider the procedures that were used to control dimensions during wartime production of the M4 and M10 periscope heads. These castings were in production for several years; so it was possible to observe many changes in molding technique. The M4 head was 6.437-inch $^{+0.000}_{-0.010}$ long and had 14 four by 36 holes cast in it. The holes had a tolerance of ±0.003 on 1.437-inch centers (Figure 2). This tolerance was required as the plastic part had to match the countersunk holes on a stamped metal window frame. This tolerance would not usually present a problem, but the part was being made in 12 four-cavity molds. To make 48 compression cavities with the same overall tolerance of $^{+0.000}_{-0.010}$ on a 6.437-inch dimension meant some very accurate workmanship. The only way to hold the mold dimensions to the limits required was to use the laminated type of mold construction. (Figure 3.) This made it possible to grind almost every dimension after surface-hardening the mold. The worst problem arose when the hole to hole distance changed during hardening, using up almost the whole part tolerance in the mold. It was necessary to leave the holes undersize and jig bore them with carbide-tipped tools after hardening. (Figure 4 shows mold in press.)

[1]Presented before the Rubber and Plastics Division, A.S.M.E., Hotel Pennsylvania, New York, N. Y., Dec. 2, 1946.

[2]Chief process engineer, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

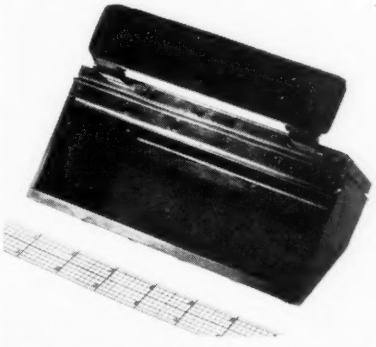


Fig. 2. Periscope Head Illustrating the Close Alinement of Parts Necessitating Close Molding Tolerances

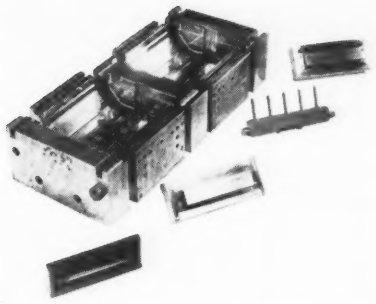


Fig. 3. Exploded View of Four-Cavity Mold for M-4 Periscope Head Showing Laminated Construction

These molds were actually made to lamination die tolerances. The clearance between force and cavity, the flash escapes, landings, etc., were held to ±0.001-inch, and all molding surfaces polished to a mirror finish. The added cost of this work may appear unnecessary, but it is now known that this extra care and precision made it possible to do the job. Design here was based on the fact that the back pressure of a mold is dependent on the fit around the force and flash escapes. If some cavities permit material to escape more freely than others, the back pressure will vary, thus also varying the shrinkage and density of the casting.

Another important, but as yet undeterminable, factor was found to be the composition and uniformity of the plastic material used. Each barrel of molding powder was mixed and rolled before use in preforming, and each molding operation was maintained as uniformly as possible. Despite these extra precautions the rate of rejection ran high. Efforts to improve the job by use of other molding methods failed, and everything seemed to point toward non-uniformity of materials. The accuracy of this assumption was finally established when one supplier came through with a general-purpose material which ran very uniform. This material apparently was very similar to the others previously used, but it performed much more satisfactorily. The reason for this successful performance is still not fully known. Nevertheless this proved that there may be something the

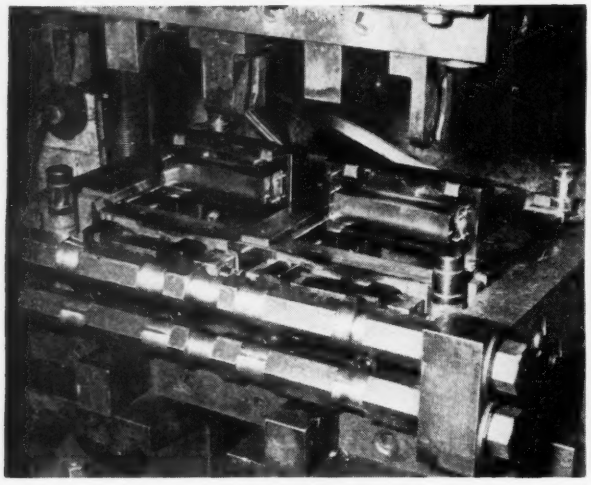


Fig. 4. View of the Four Cavity M-4 Periscope Head Compression Mold in the Press

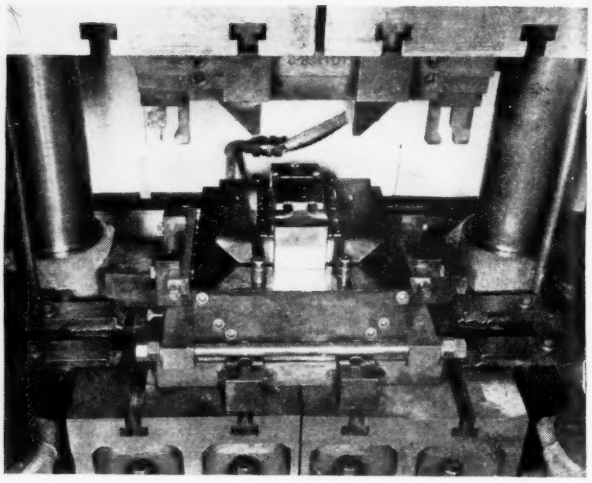


Fig. 5. View of the Two-Cavity M-10 Periscope Head Transfer Mold in the Press

materials supplier can do to help the industry, even if such help would entail higher prices for materials. When precise dimensions are required, material cost plays a minor part. This particular material reduced the number of rejects very markedly.

Maintenance of a steady cycle both in preheating and in curing was found to be very essential. All presses were operated by automatic timers, and a continuous check by inspectors warned the operator if his parts were changing dimensionally. The operators were also trained how to change dimensions by various methods. By combining control of heating and weight of preforms, the 6.437-inch long part could be varied up to 0.015-inch on the length by the operator. If preforms ran heavy in weight, the part would run long. A small piece of each preform was therefore broken off until new preforms of proper weight could be made. If preforms ran light, an additional tiny piece of preformed material would be added to each cavity loading. Almost every time a new batch of material was started, some element in the molding cycle required adjustment. It was found at times that the mold cavities showed slight variations among themselves as to the weight of preforms required. This variation could very readily be caused by a temperature difference between two cavities lying side by side if, for example, steam plates became water-logged in places. It could also be caused by flash escapes being slightly larger for some cavities than for others. The clearances between force and cavities, and the size and the position of the flash escapes also proved very important in controlling the density of the molded parts.

Any variation in time or temperature of preheating would usually show up immediately on the 6.437-inch dimension. Various types of preheating were used, with the electric circulating-air oven appearing the most reliable. The average preheating cycle needed to obtain correct shrinkage was found to be 10 minutes at 180° F. Raising the oven temperature was found to reduce the shrinkage; while lowering the temperature gave increased shrinkage.

High-frequency preheating was also used, but when the molding powder was heated to a soft condition, it was found that dimensions varied too greatly. Preheating to a high temperature in the high-frequency unit gave increased shrinkage. This appears quite natural as the quick preheat does not dry out the preforms to the same extent as the dry circulating-air oven does. When preforms were heated more slowly in the high-frequency unit, and then only to 180° F. or thereabouts, the dimensions came out very much like those from the dry oven. Shrinkage in these parts was found to be very uniform for the whole length and for dimensions between the various holes, etc. Where one flash groove permitted more material to escape than another, a slight increase in shrinkage between the holes at that place always showed up.

Many millions of periscope heads were molded by this process. These parts were also made successfully by several other molders on the same dies, and none seemed to have too much trouble running the part once they became accustomed to the molds.

The M10 periscope head was approximately seven inches long and was also molded to a tolerance of $\frac{+0.000}{-0.010}$. (Figure 5.) This head had 24 four by 36 holes to be cored for self-tapping screws. The shape of the part was such that it was necessary to use transfer molding for maintenance reasons.

Here some interesting dimension variations were caused by changes in the speed and the pressure of the transfer rams. When conventional electric preheating ovens were used, the overall length could be varied by only 0.006-0.007-inch. Although a preheat shrinkage of 0.007-0.008 per inch had been expected, the actual shrinkage measured was only 0.005-0.006-inch. By using high-frequency preheating, it was possible to vary this seven-inch dimension by as much as 0.030-inch.

Various molding speeds and pressures were tried in order to find the most stable conditions for casting. Filling a cavity in a matter of two or three seconds proved very undesirable in this case as the shrinkage was least uniform at this speed. It was found that, on the average, best dimensional results were obtained when cavities were filled in 15-17 seconds. However a 45-second transfer time was sometimes needed; while at other times it was necessary to preheat preforms in an electric oven at approximately 150° F. before placing them into the electronic preheater. Moisture variation in the preform results in changes in the loss factor, and this variable shows up in the use of electronic preheating. In such cases the operators were also taught how to change dimensions when required. Considerable difficulty was encountered in holding the $\frac{+0.000}{-0.010}$ length tolerance, but it is believed that this part would have been much easier to mold to size had the mold been made to a lower shrinkage dimension that permitted the use of dry preheating.

To obtain close tolerances in transfer molding, small gates are desirable only on small castings. Gates of 0.020-inch thickness are considered small gates. On large castings the gate size must be large enough to allow even distribution of the back pressure. If part of the casting starts to cure before the cavity is full, the shrinkage will naturally vary in different sections of the part. In addition, use of small gates did not permit a shorter curing time in this case, probably because the runners were quite long.

Afterbaking of molded parts is widely used to stabilize dimensions. Parts are placed into ovens at various temperatures, depending on the type of plastic material used. This process improves electrical qualities in addition to accelerating the warpage and after-shrinkage which will always occur to a certain extent. To demonstrate the dimensional stability achieved by use of this method, several of the periscope heads molded of general-purpose material were afterbaked and then given very careful periodic checks over an interval of nearly two years. Some of these heads were stored under room conditions; others were placed into a hot boiler room, and some were exposed to the elements. It is a matter of record that the greatest dimensional change noted during this test amounted to 0.003-inch on the seven-inch length, an almost incredibly small figure.

Summary and Conclusions

In summation, it should be emphasized that precision molding is not an impossibility, but that such precision can be obtained only when the factors of part design, mold design and construction, uniformity of materials, preheating, correct cycling of operations, and post-conditioning are properly considered. The automatic molding press which uniformly maintains many of these factors is now coming into its own. It therefore appears that a large share of the responsibility for the growth and advancement of precision molding will rest on the plastics material manufacturers.

Pyroxylin-Coated Fabrics and Paper

THE following are the figures for pyroxylin-coated fabrics and paper for the third quarter of 1946, as reported by the Bureau of the Census, United States Department of Commerce. The statistics are based on reports from 27 companies and represent the operation of processors who coat or impregnate fabrics or paper with soluble cotton or pyroxylin preparations, either separately or in combination with other materials. "Light" cotton fabrics include sheetings and print cloths; "heavy" cotton fabrics include drills, ducks, sateens, broken twills, and moleskins. All figures are given in linear yards, except for pyroxylin spread and monthly capacity which are given in pounds.

	July	August	September
Total (except Non-Fabric Materials):*			
Shipments	7,371,285	8,551,873	7,150,525
Unfilled orders†	13,799,860	13,589,223	13,281,285
Light Cotton fabrics:			
Shipments	3,800,555	4,226,478	3,277,926
Unfilled orders†	5,848,371	5,411,460	5,591,390
Heavy cotton fabrics:			
Shipments	1,849,401	2,035,951	2,209,596
Unfilled orders†	5,062,364	5,526,191	5,144,721
Custom coating:‡			
Shipments	1,721,329	2,289,444	1,663,003
Unfilled orders†	2,889,125	2,651,572	2,545,174
Non-Fabric Materials:			
Shipments	420,272	417,662	366,912
Unfilled orders†	678,813	791,931	904,908
Pyroxylin actually spread, lbs.	5,650,916	6,971,647	6,287,078
Monthly capacity§ lbs.	16,722,847	16,722,847	16,722,847

*Data include an undetermined quantity of custom coating of non-fabric materials.
†Orders on hand at the close of the month, exclusive of contracts, with shipping dates unspecified.
‡Data for fabrics other than cotton are included with custom coating to avoid disclosing data for individual establishments.
§Based on all machines suitable for pyroxylin coating, assuming 600 working hours per month and entire production on 53"-1.32 sateen coated to a finished weight of 17.5 oz./linear yd., assuming 40% solids.

New Vinyl Stabilizers

TWO new vinyl resin stabilizers, Tribase and Plumb-O-Sil, were recently announced by the National Lead Co., 111 Broadway, New York 6, N. Y.

Tribase is claimed to be the most basic lead sulfate which can be produced. It is a hydrous, tribasic lead sulfate which is suitable for any applications requiring a white, highly reactive basic lead salt, and it is a practical means of reducing the number of basic materials employed in processing vinyl plastics. The material, thoroughly tested in commercial application, is furnished as an extremely fine powder with a specific gravity of 7.1, a lead content of 83.7%, and an available lead oxide content of 67.3%, and may therefore be considered as the long-sought "white litharge." Tribase is an excellent stabilizer for vinyls. Its white color makes it readily adaptable for a wide variety of uses where stability to light, heat, and moisture is required. Besides Tribase imparts exceptionally good electrical properties, it is also claimed.

Plumb-O-Sil, said to be an ideal stabilizer for vinyl and vinylidene chloride resins, consists of coprecipitated lead orthosilicate and silica gel in the form of a soft white powder. Produced in two types, this stabilizer is particularly adapted for use in clear plastics and can be tailored to fit the particular characteristics of the plastic being used. For example, Plumb-O-Sil A is produced with a refractive index of 1.64-1.67, specific gravity of 4.1, lead content of 60-61%, and silica content of 39-40%, making it ideal for use in vinylidene chloride plastics. Plumb-O-Sil B, with a refractive index of 1.58-1.60, specific gravity of 3.3, lead content of 49-50%, and silica content of 50-51%, is designed for use with vinyl chloride-acetate plastics of approximately similar refractive index. Either type may be used when the plastic application requires a non-tinting stabilizer which will cause minimum impairment to dye or other pigment additions.

Hoover President of P.M.M.A.

JOHN R. HOOVER, vice president of B. F. Goodrich Chemical Co., Cleveland, O., and D. S. Frederick, vice president of Rohm & Haas Co., Philadelphia, Pa., were elected president and vice president, respectively, by the Plastic Materials Manufacturers Association, Inc, at its annual meeting in New York, N. Y., January 9. F. H. Carman was reelected general manager, and John E. Walker, secretary-treasurer.

The Association again named a seven-man board of directors, which will include Mr. Hoover and Dr. Frederick. Three directors continued from the 1946 board were M. G. Milliken, vice president of Hercules Powder Co., Wilmington, Del.; Felix N. Williams, vice president, Monsanto Chemical Co., Springfield, Mass.; and Harry Krehbiel, president, Catalin Corp. of America, New York. New members of the board are C. J. Romieux, sales manager of plastics division, American Cyanamid Co., New York; and W. Stuart Landes, vice president of Celanese Corp. of America, New York, and retiring president of the Association. Arnold E. Pitcher, general manager of the plastics department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and James L. Rodgers, Jr., vice president of Libbey-Owens-Ford Glass Co., Toledo, O., both past presidents of the Association, will serve in an advisory capacity to the board of directors.

The resin adhesive division of P.M.M.A. elected Whiting N. Shepard, manager of industrial glues and resins of Plaskon division, Libbey-Owens, as chairman for 1947. In addition to Mr. Shepard, the managing committee of the division will also include the retiring chairman, Louis Klein, vice president of Resinous Products & Chemical Co., Philadelphia, and C. S. Hosford, Jr., president of Pennsylvania Coal Products Co., Petrolia, Pa.

New Vinyl Adhesive

"VINYL-LASTIC," a new adhesive designed specifically for bonding vinyl sheet stock, has been developed by Permalastic Products, Centerline, Mich. The product is unique in that the bond produced is not deteriorated by vinyl plasticizers. The material produces excellent adhesion of the vinyl plastic to itself, to metal, wood, leather, and other materials. It is expected to be a boon to the shoe, luggage, furniture, apparel, and other industries which are confronted with the very perplexing problem of bonding vinyl plastics.

Technical Books Requested

A NEW appeal directed to engineers in the United States to contribute to the drive to help restore war-damaged or destroyed technical libraries in Europe, Asia, and the Philippines has been issued by the Committee on International Relations of the Engineers Joint Council. Both money for the purchase of new books, and selected used technical books and periodicals are needed. Checks should be sent to Joseph Pope, Chairman of the Book Commission, Engineers Joint Council, 29 W. 39th St., New York 18, N. Y., and the money will be used to fill the specified needs of the damaged libraries. Offers of used books and periodicals, listed with authors and titles, should also be sent to Mr. Pope, but the books themselves should not be shipped until full instructions are received. The shipments overseas are made through the American Book Center for War Devastated Libraries, Inc., Washington, D. C., through a cooperative arrangement with the engineers.

Donors of books will be furnished with bookplates which allow space to enter their names. The bookplates bear the insignia of the five national societies of the Engineers Joint Council: ASCE, AIMME, ASME, AIEE, and AICE. Since the start of the campaign about a year ago, some 20,000 items have been accepted and mailed. These included 4,592 engineering books, 9,526 periodical items, and 5,423 bound volumes of transactions of the various societies.

RUBBER WORLD
NEWS of the MONTH

Highlights—

The positions of the rubber goods manufacturing industry, the rubber traders and the government agencies concerned with rubber with regard to both the short- and long-term national rubber policy were given much expression during January. The action of the RFC in increasing the price of natural rubber to domestic users to 25¾¢ per pound also produced much comment. It is expected that temporary legislation will be passed by Congress before March 31, 1947, and that the public purchase program for natural rubber will be terminated at about that time. Permanent long-term legislation to implement our national rubber policy may not be decided upon until the end of 1947. End-use controls will be retained on most rubber products during 1947. Natural rubber production in the Far East will continue increasing, but the rate of this increase will depend mostly on the political situation in Indonesia and to a lesser extent in French Indo-China. Domestic production of rubber goods will probably be at a rate equal to that of 1946. Natural rubber prices may rise somewhat at midyear and decline in the last quarter. The company-wide contract on working conditions signed between the United States Rubber Co. and the URWA may be the first of other similar contracts which will stress equal responsibility by management and labor for uninterrupted and efficient production of rubber products.

Rubber Policy Issue of Paramount Interest; 1947 Production Rate to Remain High

January saw increased activity on the part of the rubber goods manufacturing industry, the rubber traders, and the government agencies concerned with rubber in presenting their views to Congress and the public for consideration in connection with the preparation of legislation to implement a national rubber policy. The rubber industry continued to favor purchase and distribution of natural rubber by the government throughout most of 1947, government ownership and distribution of synthetic rubber, and government end-use controls. The rubber traders agreed to government ownership and distribution of synthetic rubber and continued government control of end-use, but argued that private purchase and distribution of natural rubber should be permitted not later than March 31, 1947. Government agencies in the executive branch of the federal government seemed to favor private purchase and distribution of natural rubber after March 31, the sale of about half the synthetic rubber plants to private industry during the last half of 1947, and the retention of the control of end-use throughout 1947.

Meanwhile rubber manufacturers prepared for a year of production equal to or possibly even greater than that experienced in 1946, while not overlooking the fact that this rate would decrease in 1948. The Rubber Manufacturers Association, Inc., filed briefs with the State Department calling for a continuation of the present tariffs on mechanical goods, footwear, and druggists' sundries. Increases in labor and material costs were cited as the reasons for this request. The Office of Rubber Reserve increased the price of natural rubber (including latex) from 22½¢ a pound to 25¾¢ a pound for base grades, with appropriate differentials for other than base grades, effective with deliveries made on or after January 13, 1947.

The Rubber Policy Issue

John R. Steelman, Assistant to the President, on January 11 announced that there will be no change in the government's program for public purchase and control of importation of natural rubber until Congress has had opportunity to act upon recommendations for interim legislation extending controls over domestic rubber consumption and inventories. Mr. Steelman said that if the Congress adopts the program recommended by the President, the public purchase program would no longer be necessary and would be discontinued on March 31, 1947.

The text of a letter to Major General Philip B. Fleming, Administrator, Office of Temporary Controls, on this subject follows:

My dear General Fleming:

I have reviewed with great care the evidence regarding the question of continuation of public purchase of rubber, assembled in numerous conferences on this subject including particularly a joint meeting on December 20, 1946, of representatives of the several agencies of government concerned, representatives of rubber-consuming industries and of rubber importers and dealers.

The rubber-consuming industry, with the exception of a very few companies, has strongly urged the continuation of public purchase of natural rubber until such time as permanent legislation in support of the synthetic rubber industry has been enacted by the Congress. I am convinced that it would be inconsistent with the orderly decontrol policy of the President to continue public purchase this long, especially if, as seems probable, the Congress does not enact permanent rubber legislation until after March 31, 1947.

On the other hand, the rubber traders have urged the immediate termination of public purchase, without reference to action by the Congress as regards either temporary extension of the war powers relating to rubber or permanent rubber legislation. I have come to the conclusion that such action might undermine the effective continuation of controls on the use of natural rubber, which we are agreed must be continued through and beyond March 31.

I have discussed this matter with the President and he has informed me that he will request of the Congress action which will provide for the following:

(1) A declaration of policy stating that it is the intention of the Congress, in the interest of national security, to protect and maintain a minimum synthetic rubber industry in the United States.

(2) The designation of committees of the Senate and the House of Representatives to investigate the rubber problem and to recommend, at an early date, the enactment of permanent rubber legislation.

(3) A temporary extension of the war powers as applied to rubber, authorizing continued exercise of controls on rubber consumption and inventories pending enactment of permanent legislation by the Congress.

The extensive research done by the Interagency Policy Committee on Rubber, under the chairmanship of Mr. W. L. Batt, should greatly facilitate the work of these Congressional committees.

Action by the Congress along the lines indicated immediately above should provide the minimum assurances needed by the rubber industry to enable them to resume private purchase of natural rubber in an orderly manner, and should provide the basis for an effective, continuing rubber program.

I have decided, therefore, that the public purchase program of natural rubber should be continued on approximately the present basis to March 31. Assuming that the Congress, on or before March 31, 1947, takes action as indicated above, the public purchase program will no longer be necessary and can be discontinued at that time. Will you please take the necessary steps to put this decision into effect.

Sincerely,
JOHN R. STEELMAN
Assistant to the President

On January 10, President Truman in his budget message to Congress recommended the liquidation of the Rubber Development Corp. This action might be taken as a possible additional sign that the government plans shortly to discontinue public purchase of natural rubber and return it to private industry.

Statement of RTA

The Rubber Trade Association of New York, Inc., in a statement on January 6 indicated its position as follows:

"The Rubber Trade Association of New York, Inc., whose members normally import about 70% of all crude rubber, agrees that government control over consumption and end-use specifications of both natural and synthetic rubbers are necessary. Sound arguments have been presented for continuation of these controls since national security is tied in with the maintenance of a continued production and consumption of synthetic rubber—the same may be said for stockpiling of natural rubber up to the amounts recommended by the Army and Navy.

"However, the RTA in general does not agree with the decision made by Mr. Steelman's office on November 9 that the United States Government should continue as the sole purchaser of crude rub-

ber. The British Government announced that as of November 18 all restrictions on trading in crude rubber for shipment from the Far East after January 1 would be terminated and an open market restored. As a consequence, the rest of the world which accounts for approximately 40% of the world's rubber consumption may make up its own mind as to quantity, quality, and price of its rubber purchases.

"In November the Rubber Industry Advisory Committee of the CPA representing the rubber manufacturers, recommended, although not unanimously, that the United States Government should continue to buy and sell rubber at fixed prices until such time that the Congress enacts laws to extend consumption controls which expire with the War Powers Act on March 31. The main argument used on the part of the manufacturers was their expressed fear that since there is not enough natural rubber in the world for the United States to reconvert 100% to natural rubber, prices would 'skyrocket.'

"The argument is unsound since end-use control would avoid this situation. If end-use controls are not extended beyond March 31, which is highly improbable, government purchase and ownership would not help the situation at all since the government would have no power to allocate or purchase beyond the Army-Navy stockpile requirements.

"When rubber is returned to private purchase, the continued present production of synthetic should act as a brake on any possible temporary increase in the price of crude, since too large a premium of crude over synthetic would tend to discourage crude consumption. Furthermore, if end-use controls are continued, consumption is automatically regulated to supply. In addition, the rubber manufacturers will receive their first quarter 1947 requirements from the government and have the privilege of purchasing a further 60-day inventory. This would give them considerable protection against being forced into creating an abnormal immediate demand for supplies.

"The whole purpose of the government's being in the rubber picture at all is to preserve the synthetic industry, not to continue carrying a tremendous inventory purchased with public funds to be made available at a guaranteed price to the fluctuating requirements of private industry.

"The most unfortunate result of Mr. Steelman's decision to continue RFC buying, however, is the fact that the United States Government is trying to buy 50,000 tons of rubber for January shipment at a fixed price (20¼¢, f.o.b. Far East) in an open and fluctuating market. The result is that 20¼¢ simply has become a firm floor price in the market since November 20 and the best grades of rubber are being sold at slightly higher prices for shipment to other countries. To date only 20% of the required amount has been purchased and if the full 50,000 tons is not shipped, the projected United States stock-figure for March 31 will have to be revised downward. It is the RTA's contention that through unrestricted private purchases the United States would have been assured the full amount or more. The situation will become worse if this policy continues. Just before the war it was proven that bulk purchasing by a government cannot succeed in an open market—it can only succeed if the governments of the producing countries act as bulk sellers. This has been proven not only in rubber, but in other imported commodities.

"In our opinion the continuation of attempted government purchasing will work against the security objective, which is so constantly being stressed, since it appears to be failing to bring in the quantities of crude rubber needed.

"It is the consensus of opinion of the RTA that the method of purchasing rubber and the control of the use of rubber are two separate problems, and that the necessity for their connection has been overemphasized. The return of the importing of crude rubber in a free world market to normal channels will substantially aid rather than jeopardize the security aims of the government and will be a long step in the direction of restoring free competitive enterprise which is the government's expressed policy."

Legislation Suggested

Legislation was suggested by various members of Congress and by the President in his budget message during January. A resolution was prepared by the Senate Military Affairs surplus property subcommittee for consideration by Congress at its earliest opportunity. This resolution declares United States policy to be the maintenance at all times of "a technologically advanced and rapidly expandable domestic rubber producing industry of sufficient productive capacity to assure the availability in times of national emergency of adequate supplies of domestically produced rubber to meet the industrial, military and naval needs of the country." It further states that, following a joint Congressional investigation, a report is to be made to both Houses on or before May 1, 1947, together with such recommendations for legislation as are deemed necessary to accomplish the policy outlined.

The investigation would be conducted by subcommittees of the Senate and the House Armed Services committees, each subcommittee consisting of not more than five members, who would, whenever possible, conduct joint hearings and would have subpoena powers.

The resolution points out that maintenance of the synthetic rubber industry is necessary in addition to stockpiles of rubber which are to be acquired and held under the provisions of the Strategic Materials Stockpiling Act of 1946. The resolution concludes with the statement that:

"The powers granted to the President of the United States pursuant to the Second War Powers Act, 1942, as amended, are hereby extended until July 31, 1947, insofar as such powers are necessary to continue in effect and to modify wherever necessary and desirable regulations of the Office of Temporary Controls with respect to rubber and rubber products."

The President's budget message to Congress outlined in some detail a forecast of the government's activities in natural and synthetic rubber for the next fiscal year starting July, 1947. Budget estimates are based on the assumption that: (1) the government will continue to be owner and operator of most synthetic rubber plants in the United States; (2) the government will be called upon to produce 508,000 tons of synthetic rubber; (3) the Reconstruction Finance Corp. will not be required to purchase natural rubber; (4) the RFC will assist in controlling distribution to United States consumers. By July the government expects not only to have ceased crude rubber purchases for distribution to industry, but, further, that it will not be called upon to buy crude rubber for strategic stockpile. The 235,000 tons of crude natural rubber it expects to have on hand June 30—for transfer to the stockpile—represents 90,000 tons to be accumulated out of purchases during the current fiscal year of 465,000 tons, in addition to stockpile accumulated during previous years.

The outlook for retention and disposal of synthetic rubber plants is for 28 out of the 51 war-built synthetic rubber plants to be kept in operation during the next fiscal year to supply the national demand for synthetic rubber. Of the remaining plants, 17 are expected to be declared surplus by next July 1, and another three plants will be declared surplus after that date; while three other plants costing approximately $49,000,000 will be maintained in standby condition during the next fiscal year. The government assumes that the sales prices of all types of synthetics will remain unchanged during the next fiscal year, and that total sales will amount to $217,772,800, as compared to $300,653,000 during the current fiscal year. Average sales price for the estimated 508,000 long tons to be sold will be 19.13¢ per pound, resulting in a net profit of 4.93¢ per pound, it was further stated.

A bill to provide for the production of 1,700,000 tons of synthetic rubber annually, one half to come from the use of grain alcohol, was introduced in the House during the latter half of January by Carl Curtis of Nebraska. The Curtis bill also directs the Department of State to make no commitment to a foreign government that would preclude the imposition of tariffs on natural rubber; calls on the Tariff Commission to supply Congress with data on costs of production of synthetic rubber and invoice costs of natural rubber, and requests the President to establish a synthetic rubber policy.

Leslie Arends, of Illinois, also introduced a bill in the House at about the same time. This measure would: (1) authorize the government to act as the sole purchaser and seller of crude rubber until permanent rubber legislation is established, but not beyond March 31, 1948; (2) authorize continued controls over rubber usage until permanent legislation is enacted; (3) broaden the Strategic Materials Stockpiling Act to permit greater government holding of crude rubber and to authorize frequent rotation of stocks to ensure that fresh rubber is always on hand in adequate supply; (4) authorize a Congressional investigation with a view to enacting permanent legislation in support of a strong synthetic rubber industry and to the maintenance of an adequate crude rubber stockpile.

Statement by Collyer

John L. Collyer, president of The B. F. Goodrich Co., in a pamphlet entitled "Remember December Eleventh," issued in mid-January, pointed out that on that date in 1941 America's World War II Rubber Famine began—with cessation of general sale of auto tires—and that "we should Remember the Rubber Famine" as well as "Remember Pearl Harbor" in keeping alert to national security needs.

According to Mr. Collyer, crude rubber "may be available late in 1947 in such quantities that actual, physical need for general-purpose synthetic rubber may fall off very sharply indeed; then our facilities for making rubber on this side of the world could languish, die and disappear unless our government takes positive action." If this possibility happens,

"we shall have allowed one of the nation's most dearly won security 'insurance policies' to lapse," he warned.

Regarding the building up of a large new stockpile of crude rubber as a security measure in itself, the Collyer statement said it might take the country four or five years to accumulate even a "reasonably adequate" stockpile of natural rubber.

The Goodrich company's own thinking is that, regardless of economic factors, Congress should give early consideration to the adoption of a program assuring that (1) the government's efficient facilities for the manufacture of American-made rubber be maintained in standby condition, ready to run on immediate notice; and (2) a sufficient tonnage of American-made rubber for the maintenance of national security be made and used each year.

Beyond these provisions for security, Mr. Collyer said, the principle of competitive enterprise should prevail, because the free play of economic forces will do more than anything else to spur research and development of all types of rubber, to broaden their usefulness, and to make more and better products available to more people.

Statement by Litchfield

P. W. Litchfield, chairman of the board, Goodyear Tire & Rubber Co., in another pamphlet entitled "Our National Interests," number six in the series of his "Notes on America's Rubber Industry," issued during January, strongly recommended that Congress continue government controls on the importation, allocation, and specification of the uses for natural rubber in order to protect the national interests of all Americans.

To understand how our national interests are involved, as rubber passes through the final stages of its transition from war to peace, consideration should be given to three major and strongly interrelated factors: (1) there should be full and complete protection for our national synthetic rubber plants to the end that they will always be readily available to our needs: (2) receipts of natural rubber from the Far East will be short of national consumption during at least the first half of 1947, a fact which calls for the maintenance of controls; and (3) the War Powers Act, under which present stabilizing controls are maintained by the government, expires March 31, 1947, or several months in advance of the earliest date at which we can expect an adequate supply of natural rubber, Mr. Litchfield pointed out.

There is only one way in which to protect our synthetic producing facilities and that is to keep them in operation on a minimum need basis and to keep what remains or may be needed in standby condition. This responsibility must be shared by the entire nation and by its very nature discharged by government, it was said. These facilities are operating smoothly and effectively under the present program of government ownership and private management. Any major deviation from this policy invites danger to these plants.

The powers of importation, allocation and specification are closely interdependent. It is difficult to comprehend how any one of them might be relaxed without sacrifice of the overall objectives. It is disturbing to contemplate any piecemeal dismantling of the control structure which has so well served our national needs. Certainly, we have the national prudence to preserve these controls until such time as they can be relaxed with the assurance of safety. Such assurance can be afforded only by an adequate current supply of natural rubber. We have endured these controls for a matter of years, and it would seem that we could carry on for a comparatively few more months despite our natural eagerness to return to prewar principles, Mr. Litchfield added.

A tabulation of the best obtainable estimate of rubber production and consumption for 1947 was next presented. (See table at top of column.)

	Long Tons				
	1st Q.	2nd Q.	3rd Q.	4th Q.	Year 1947
World arrivals in consuming countries	250,000	260,000	280,000	310,000	1,100,000
Arrivals in U. S. A.	*200,000	110,000	165,000	175,000	650,000
Est. natural rubber consumption in U. S. A.	130,000	125,000	125,000	120,000	500,000
Est. synthetic rubber consumption in U. S. A.	170,000	135,000	100,000	95,000	500,000
Natural and synthetic rubber consumption	300,000	260,000	225,000	215,000	1,000,000
U. S. A. natural rubber stocks end of period† (250,000, Jan. 1, 1947)	320,000	305,000	345,000	400,000	400,000

*75,000 tons of which come from British accumulated stock rather than direct from production areas.
†Including the stock which may be frozen by military for possible emergency.

In connection with the above table, attention was called to the fact that American receipts and consumption of natural rubber during the second quarter indicate a supply deficit. Here is an invitation to speculative excesses costing the American consumer of rubber products millions of dollars, it was warned.

The only satisfactory protection we have against such a boom-and-bust period in the rubber market is for the government to continue its control over purchase and importation. The present price of natural rubber, 20¼¢ per pound in producing markets, is entirely fair to the foreign producer. A small group of international speculators would like to see the price go higher, as it would if we dropped our guard at this particular time. But higher prices would not increase the supply of rubber, and our interests are concerned with the protection of the American consumer against such exploitation.

"Why, you may ask, is this speculative danger so probable when the combined supply of natural and synthetic rubbers is adequate for our total needs?" asked Mr. Litchfield.

The candid answer is that a tire made exclusively from natural crude rubber would have customer preference over one containing large proportions of synthetic rubber. No American tire manufacture willingly will permit his competitor to have such an advantage. Consequently, if natural rubber should be placed in a free market before there is an adequate supply, bidding for the limited quantity available would be active and persistent, it was pointed out. Because of this same customer preference, the output of our synthetic rubber plants would under free market conditions soon find itself in vast surplus, and these important facilities would fall into progressive disuse and deterioration. Given time for the further development of synthetic rubber, this matter of public preference for natural rubber tires may be considerably modified.

Certainly, the arguments for a continuation of the existing national rubber policy are powerful, once they are understood. The argument is *not* for keeping these controls in perpetuity, but only long enough to permit the restoration of natural economic balances. March 31, 1947, is too early for the abandonment of rubber controls including government purchase in America. The provisions of the War Powers Act insofar as they pertain to rubber controls should be continued in effect for some time after that date. This situation is earnestly recommended to the attention of Congress, Mr. Litchfield concluded.

American Automobile Assn. Statement

In letters to Congressional leaders, H. J. Brunnier, president of the American Automobile Association, pointed out during January that imports of natural rubber had far exceeded expectations and declared that permitting a free-for-all competitive scramble before permanent legislation is enacted would be "little short of a national disaster." While urging temporary extension of controls, the AAA also called upon Congress to begin formulation promptly of a permanent program that will insure continued production and use of synthetic rubber.

"The issue facing Congress," Mr. Brunnier declared, "involves national security at the top level and it involves protection for American consumers. As regards the latter, it need only be pointed out that at the rate of tire production in 1946, a difference of one cent in the price of rubber would mean more than $15,000,000 to motor vehicle owners alone.

"Representing, as it does, more than 2,000,000 passenger-car owners, our Association is deeply interested that Congress should, at the earliest possible moment, enact legislation that will establish a permanent rubber policy for the United States."

The AAA executive transmitted the text of a resolution unanimously adopted, in San Francisco on November 14, by the first postwar meeting of motor club delegates, which called for speedy action by Congress to provide for continued production and use of synthetic rubber to insure that not less than one-third of the nation's total annual consumption be American-made rubber; for maintenance of 350,000 tons' capacity of synthetic production facilities in standby condition; and for continued research in the interest of improving quality and usefulness of the synthetic product.

RFC Increases Natural Rubber Price

The RFC announced on January 23 an increase in its selling price of natural crude rubber (including natural rubber latex) from 22½¢ to 25¾¢ per pound basic grade effective with January 13 deliveries. A memorandum addressed to "Members of the Rubber Manufacturing Industry," read as follows:

"Under the date of September 12, 1946, you were advised that in accordance with the provisions of a Directive dated September 5, 1946, from the Office of War Mobilization & Reconversion, the Reconstruction Finance Corp. would maintain the basic sales price for natural crude rubber at 22½¢ per pound until January 1, 1947.

"The aforementioned Directive was based upon the first-in first-out inventory accounting procedure, in accordance with which it was estimated that the low priced rubber then in Reconstruction

Finance Corp. inventory, together with anticipated arrivals under Congressionally approved subsidy arrangements, would be adequate to cover all sales to domestic consumers until such latter date. This lower priced inventory, together with rubber received under subsidy arrangements is now exhausted. It is, therefore, necessary for Reconstruction Finance Corp., Office of Rubber Reserve, to increase its base price of crude rubber to take care of the increased cost of 150,000 tons of rubber procured during the third quarter of 1946.

"Effective with deliveries made on and after January 13, 1947, rubber will be sold at a new base price of 25¾¢ per pound (plus the applicable uniform freight charge), with appropriate differentials for other than base grades."

In a general release on this subject issued on the same date, the RFC stated, "It is hoped that circumstances will permit a reduction in the price of synthetic rubbers some time in the near future."

Comments by the rubber goods manufacturing industry were along the lines that although the industry does not want to be subsidized, neither does it want to pay the extra cost for this natural rubber. The industry argued with the RFC that this price increase could be offset with profits the RFC is now making from the sale to industry of synthetic rubbers.

Herbert E. Smith, president of the United States Rubber Co., in a public statement said:

"Technically, the RFC may be correct in its use of first-in and first-out accounting method, but the increase comes at a time when the rubber industry is trying to maintain stable price conditions, which have existed for several years. The industry believes this stability should be maintained until Congress can finally determine policy on the continuation of public procurement, specification controls and the disposition of the synthetic rubber industry. The RFC action is contrary to the effort being put forward by all industry to prevent a further impetus to the inflationary spiral by holding the line on prices or wherever possible by reducing them in the interest of the consuming public.

"Such a move is contrary to the expressed recommendation of the majority of the Rubber Industry Advisory Committee to the Office of Temporary Control that some method be found to maintain the former selling price to offset the extra cost of the 150,000-ton lot of rubber. The rubber industry is not seeking subsidy from the government. As a matter of fact, the rubber industry is paying a substantial premium to the RFC in synthetic rubber prices.

"This move may set a pattern that will cost consumers millions of dollars plus additional millions for such rubber stockpiled in the national interest, and it will not produce any material increase in the available supply of crude rubber to this country."

Mr. Litchfield was reported as having criticized the RFC's price increase as "unfortunate — unnecessary — and unjustified." He charged that the decision plays into the hands of international speculators to the disadvantage of the American rubber consumer and industry. It will not result in the addition of a single pound of natural rubber to America's short supply, he added.

William O'Neil, president of The General Tire & Rubber Co., stated that consumers already are looking for price reductions in tires, but "this RFC order definitely will postpone the day when this reduction is possible."

Second RTA Statement

The Rubber Trade Association of New York on January 30 released another statement in which it took issue with a number of public statements made by executives of tire companies urging continued government buying and importation of natural rubber.

The Association referred to "one of the leading tire manufacturers as saying that government control of the importation of natural rubber is the only satisfactory protection against 'a boom-bust period in the rubber market' and against 'speculative excesses costing the American consumer of rubber products millions of dollars.'"

In explaining why a speculative danger is imminent when the combined supply of natural and synthetic rubber is now adequate for total U. S. needs, this tire manufacturer stated that "a tire made exclusively from natural rubber would have customer preference over one containing large proportions of synthetic rubber" and "no American tire manufacturer willingly will permit his competitor to have such an advantage. This would cause uncontrolled rubber to become involved in active and persistent bidding before adequate supplies are available."

With reference to these statements, the RTA pointed out that the price of any commodity is governed by supply and demand. If the government will continue its powers of end-use control beyond March 31, as the RTA agrees it should, these controls will be sufficient to keep demand in balance with supply. A manufacturer who would buy rubber with his own funds far in excess of the amount the government would permit him to use in his product would indeed be speculating, it was said.

If crude rubber, when returned to an open market, sells at too large a premium over synthetic rubber, the demand for crude will automatically fall and the demand for synthetic will stay high. The proposal is made that "there should be full and complete protection for our national synthetic rubber plants to the end that they will always be readily available to our needs." We can think of no better way to accomplish this than a premium for crude rubber over synthetic, the RTA stated.

However the crude rubber producing countries are more interested in volume consumption of their product today than in excessively high prices. The problem confronting our government is not a possible high price of crude, but a future situation when crude may sell below the cost of synthetic. The rubber manufacturers would then abandon the use of synthetic unless directed to continue its use by the government. This is the problem confronting Congress, and it is for this reason primarily that an extension of government powers of end-use control should be extended beyond March 31.

The issue of continued government buying *versus* private buying is simply one of buying mechanics. Should the Reconstruction Finance Corp. continue to buy with public funds and accept market risks, or should private industry resume buying with its own money and reassume its responsibilities in a free economy?

In commenting on the recent increase of the RFC selling price of crude rubber to manufacturers from 22½¢ to 25¾¢ per pound, a manufacturer's spokesman was quoted as follows, the RTA statement said.

"The RFC's action is contrary to the efforts being put forward by all industry to prevent a further impetus to the inflationary spiral by holding the line on prices, or wherever possible by reducing them in the interests of the consuming public. This move may set a pattern that will cost the consumer millions of dollars, plus additional millions for such rubber stockpiled in the national interest, and it will not produce any material increase in the available supply of crude rubber in this country."

In reply, we submit the following facts, the RTA said:

"The government purchased 150,000 tons of rubber at a delivered cost of 25¾¢ per pound for shipment during July/September as against its previous purchase cost and selling price of 22½¢. This 150,000-ton quantity is the rubber it is now selling to the manufacturers at 25¾¢. There is no reason why the RFC should sell at a loss and subsidize with the taxpayers' money.

"Subsequently the government purchased 200,000 tons for October/December shipment at 20¼¢ f.o.b. or a landed cost of approximately 22½¢ as well as further quantities for January shipment at the same price.

"The government has just announced its buying price as being unchanged from 20¼¢ for January/February shipment. Furthermore the RFC indicated that a reduction in the price of synthetic rubber was likely in the near future.

"Members of the Rubber Trade Association of New York have advised their suppliers in London and the Far East of these facts in order to counteract any possible inflationary effects of recent public statements."

Futures Contract Changed

The Commodity Exchange, Inc., of New York, approved a revised futures contract during January in preparation for possible resumption of trading after March 31 when the RFC rubber buying program may be discontinued. Among the contract changes was the change of the contract basis grade from No. 1X ribbed smoked sheets to No. 1 ribbed smoked sheets. Another amendment to the prewar rubber contract added the ports of Boston, Norfolk, Philadelphia, and Baltimore, to New York, as delivery points, and made barebacks — rubber wrapped packages of smoked rubber sheets — eligible for delivery against contracts in addition to prewar bales and cases.

The Natural Rubber Supply and Price Picture

Estimates of the amount of crude rubber production in the East East during 1947 are being revised upward. A few months ago it was indicated that production for 1947 should total about 900,000 to 950,000 tons. Present estimates are for 1,100,000 to 1,200,000 tons.

According to J. G. Loeber, writing from Amsterdam for Lockwood's January Rubber Report, for the year 1947 only about 40,000 tons of rubber have been incorporated in trade agreements with various European countries because for the time being the larger part of the Netherlands India production leaves the country by illegal ways, mainly to Singapore. The provisional agreement of Linggadjati between the Dutch and the Javanese republic so far has not led to any diminishing of the existing tension. The extreme nationalists are of the opinion that the agreement does not go far enough, and on the other hand

the large portion of the population is feeling uneasy because of the fear that their interests will be handed over to the extremists. Moreover the republic apparently has been unable to enforce the armistice conditions. The number of Indonesian attacks, instead of declining, has materially increased since the truce started.

Plans to have the rubber estates reconstructed by the government have been abolished, and the private owners will take the rehabilitation in their own hands. It is hard to guess at what moment the estates will be in a position to start working again. This writer estimated that it will take three to six months for operations to begin in Java and six to nine months for Sumatra, excluding the extreme northern part, which may take well over a year.

H. T. Karsten, managing director of United Baltic Corp., Ltd., writing from London for this same report, states that the London landed market is not really functioning as yet. This state of affairs is not unexpected as there is no free stock of rubber for sale, and none is likely to arrive until some time toward the end of February, it was explained. There is no apparent speculative interest.

The London landed value price of 13.3/8*d*. (22.5¢) for the April/June position is a middle price between the manufacturer-buyers' of 13.1/4*d*. (22.3¢) and the dealer-sellers' of 13.1/2*d*. (27.7¢). The difference represents the cost of making c.i.f. purchases ready for sale as London landed, but until speculators are interested and surplus free rubber is actually arriving, it is not likely that the difference will be bridged, it was stated.

For July/September London landed, the position is somewhat different. Small business has been done at 13.1/8*d*. (22.1¢), which some dealer-buyers considered cheap in comparison with corresponding arrivals from the East; while other dealers think that the expected excess of production may already be felt by then. The question of excess production is really the crux of the situation today, and as in most instances of this kind, it is not a question of right view, but of right timing. Shipments from Malaya, including reexport, were about 80,000 tons in November and are expected to be even higher in December so as to ship as much as possible against the last sale to the U. S. A. and, in particular, to complete the high-price Board of Trade contracts in this country.

The stocks in Malaya have been reduced slightly during the last few months, and a further reduction by the end of December may be expected, but owing to the difficult working and transport conditions in the Far East at the moment and also the slowness of shipping, larger quantities are by necessity required in the pipeline from the tapping on the estates until shipment can take place.

From the first of January the rubber market will be left to its own devices. The Board of Trade purchasing will be finished, and, so far as can be judged at the moment, the Rubber Development Corp. will not be a prominent buyer. On the other hand there has been a good demand from a number of European countries, and from overseas countries like South America, South Africa, Australia, China, etc.; also a gradually increasing demand from the manufacturers in England, although there are apparently a number of these who are still impressed by the prospects of excess production of rubber and expect an almost immediate reaction.

A certain amount of unsold rubber will undoubtedly be shipped by dealers to this country during the next few months to meet the demand of exactly such factories and also for the purpose of building up a stockpile of free rubber to meet possible speculators' requirements and create an arbitrage market.

Although some of the lower grades which are not so sought for on this side may be finding their way to the U. S. A., Mr. Karsten doubts whether this will be of any significance, and the U. S. A. as a whole will hardly be able to buy as long as prices in the East can be kept above the controlled U. S. A. maximum price. From a purely statistical point of view, it would be hazardous to guess that this present price level in the East can be maintained, as it would seem that the requirements from other countries would be insufficient to cover the present estimate of supplies available for January/March shipment.

The fact that there is a stop limit in the present U. S. A. prices may give confidence in holding out for something more, and this has, up to now, forced buyers from other countries to pay a small premium of 1/8*d*. to 1/4*d*. (0.26 to 0.52¢) per pound. If anything, there has been a tendency during the last few days for the top grades to harden, perhaps in anticipation of more buying inquiries from countries whose manufacturers will be permitted to buy individually and without their own government's controlling influence after the turn of the year.

The necessity of holding Far Eastern stocks at a higher level than usual, the desire to restock the London market, and possibly the fact that many of the purchases for January/March are being shipped in January are undoubtedly influencing the position. The pent-up demand from the U. S. A. is in itself a steadying feature, and the development during the next month or so will decide whether the market will come down to the U. S. A. level or whether the U. S. A. will have to reconsider its further buying policy, whether for government account or for private buying. In the latter case there would appear to be a possibility of higher prices toward the middle of the year, but this can hardly be anything but a temporary feature as the outlook further forward is less hopeful, although so much will depend on political development in the Far East and especially in regard to the Dutch East Indies.

Mr. Karsten mentioned that in making the above remarks, he was assuming that the government stocks in Great Britain will not be disposed of in competition with new import. There is no indication of such action as yet, and, although no decision may yet have been made, several newspaper comments have advocated retention of these stocks as a strategic reserve and also because the selling of these stocks now might have an adverse influence on prices.

Rene Fabre, secretary to both the French Rubber Growers' Association and the French Interprofessional Rubber Committee, also writing in Lockwood's January 15 Report, states that the French Government is prepared to free the rubber market as from the very beginning of 1947, but it would like to receive from the other natural rubber producing countries the assurance that the Metropole will be supplied without any interference with the quantities she needs, i.e., that these countries will come back themselves without any limitation to a free market operating on a commercial basis. It must be stated that during the years 1943-1944, Indo-China had built up large stocks of rubber to meet French needs after the liberation. Taking into account the needs of her allies France has agreed to sell them a large amount of these stocks that she misses now. If, moreover, Indo-China was given complete freedom to sell her rubber wherever she likes, the French industry might not be provided in 1947 with the quantities necessary for her own consumption.

The political situation in Indo-China is much clearer than in 1945, and substantial progress has been accomplished in the way of rehabilitation although the question of labor remains a difficult problem to solve. The lack of labor force and the difficulties of reequipment will limit the expected output to about 25-30% of the potential capacity, it was said. All increase in the Indochinese production over 30,000 tons a year is dependent on an increase in the labor force.

The question of reducing net costs is directly linked to an increase in production, and this in turn depends on the policy of the French Government with regard to taxes on rubber. The rubber export duty represents actually 13% of the net cost, and this and certain import duties are a sensible obstacle to the reduction of net costs, it was explained.

W. A. Stanton, reporting from London on Malaya, from which he recently returned as manager of the Harrisons Crosfield group of estates, comments on the new Malayan constitution offered to the native Sultans. In a sincere, but inept attempt to give the non-Malay inhabitants political rights which they so richly deserve, since their return the British have tried to force upon the Sultans new constitutions which contain several unnecessary and objectionable features. This policy has caused resentment among the Malays, but it is safe to say that these difficulties will be ironed out amicably during the negotiations now in progress, it was said.

Mr. Stanton also reviewed the development of rubber production in Malaya since October, 1945, when only a few smallholders had started to produce. At that time conditions were chaotic, and until April 1, 1946, Malay was under military administration. For many months the production of rubber was only made possible through the ingenious improvisation of the men on the plantations. Latex cups were required by the millions; coconut shells were used instead. No coagulant was received from Great Britain until toward the end of May, 1946; so acid was made on the estates by distilling wood or fermenting coconut juice. Rough tapping knives and field tools were hammered out of scrap metal, and latex buckets were produced locally, usually out of corrugated iron sheets from some of the buildings. Wooden latex tanks were made from hand-sawn boards, but on most estates tanks were so few that each had to be used twice each day. There was a great dearth of trained personnel, and supervisors were often in charge of five or six plantations dotted along as much as 30 or 40 miles of road. Labor unrest started to attain serious proportions during the second quarter of 1946. It is amazing not only that so much rubber was produced under such conditions, but that the average quality of the output was so high, Mr. Stanton stated.

Arthur Nolan, of New York, reporting on latex production in the Far East, pointed out that although current U. S. A. consumption in natural rubber latex is only about 600 tons dry weight a month, future U. S. requirements may reach 9,000 tons a month. Total U. S. consumption is now about 6,000 tons a month, and the major portion is, of course, synthetic latex. Mr. Nolan indicates that future U. S. demand will increase to 9,000 tons a month of natural rubber latex and decrease

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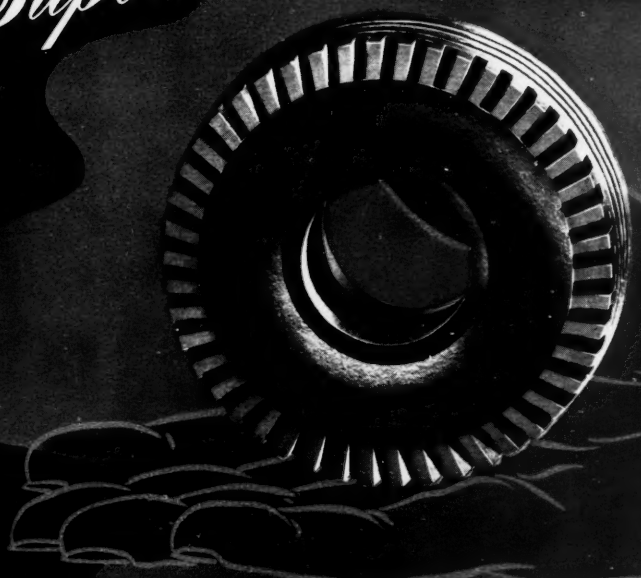

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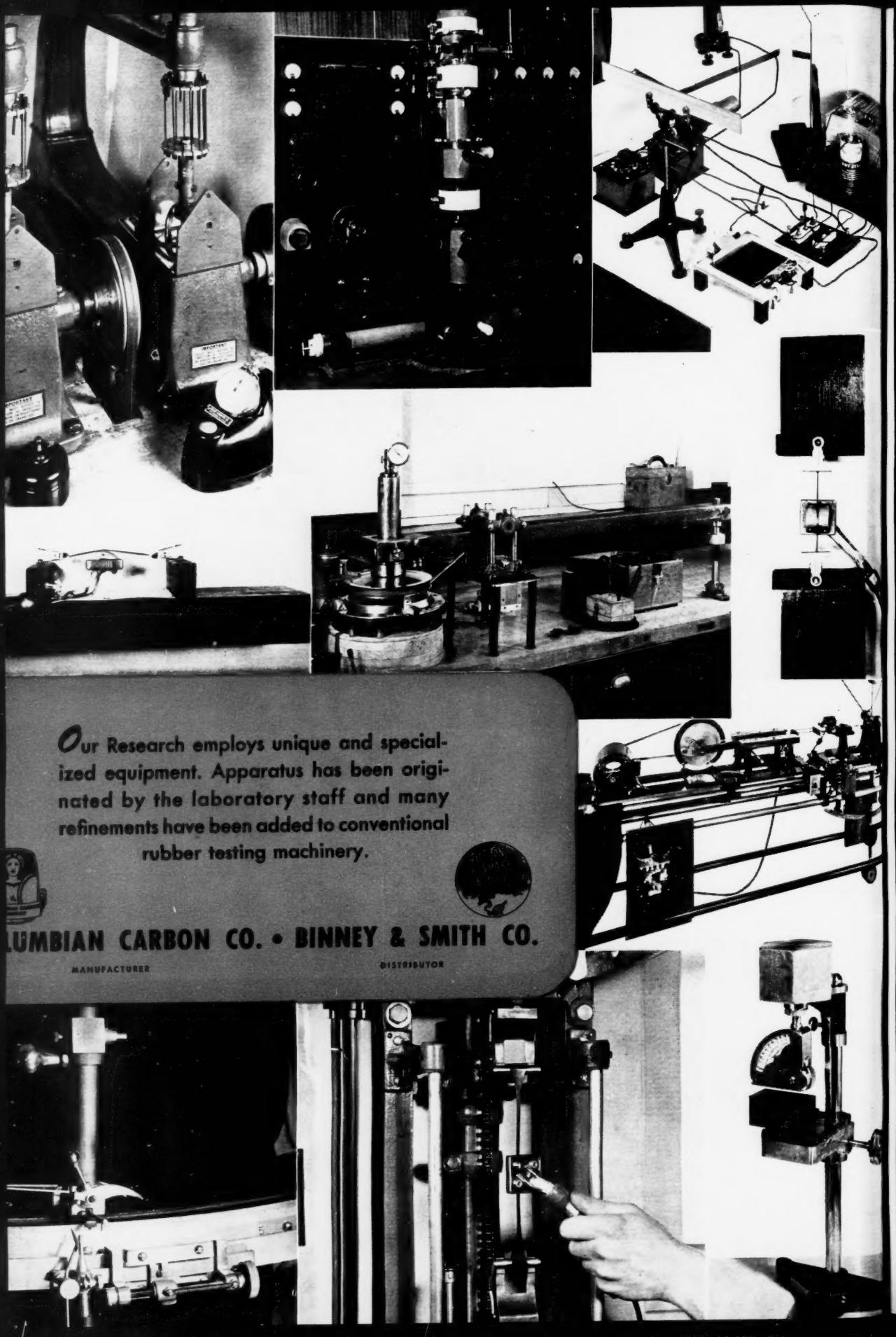

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to 1,000 tons a month of synthetic latex. This article, which was written following Mr. Nolan's return from the Far East in December, 1946, for Lockwood's Report, appears on page 661. It discusses the problems of labor, equipment, transport facilities, and the necessity of the clarification of British and American policies on rubber in order that the output of natural rubber latex may be accelerated.

Department of Commerce Reports

The Department of Commerce, Office of International Trade, released information on rubber exports from the Far East and imports into the United States during eleven months of 1946 and also information on rubber as obtained from reports of foreign service officers and from other sources.

According to E. G. Holt, Department of Commerce Rubber Adviser, shipments from the Far East amounted to 122,000 long tons in the first quarter of 1946, 158,000 tons in the second quarter, and 290,000 tons in the third quarter. Shipments during October and November were about 100,000 tons a month. British Malaya was the largest exporter. Exports from this area for the first eleven months were 488,838 tons, including reexports of rubber imported into Malaya.

The following tables show exports of rubber from each of the Far Eastern areas, and United States imports from the same areas during the first eleven months of 1946.

EXPORTS OF RUBBER FROM FAR EASTERN AREAS
(IN LONG TONS)

Country	1st Half, 1946	3rd Quarter, 1946	October, 1946	November 1946
British Malaya*	87,871	118,435	59,709	57,340
Netherlands India†	69,623	68,389	19,182	17,935
Indo-China	64,739	50,243	n.a.	n.a.
Ceylon	48,987	25,767	n.a.	n.a.
Siam‡	4,326	7,036	2,321	4,645
India	499	....	....	....
Burma	3,149	321	78	197
Philippines¶	368	321	72	76
Japan¶	....	7,310	2,537	....
British Borneo§	a	13,026	3,278	4,253
TOTAL	279,562	290,848	b87,177	b84,446

* Net exports after deducting reported imports.
† Imports into Malaya, plus exports to U. S. and Europe.
‡ Imports into Malaya, plus exports to U. S.
¶ Imports into U. S.
§ Exports from Sarawak, plus Malayan imports from British North Borneo, Brunei, and Labuan.
a Included with Malayan net exports.
b Incomplete (Indo-China and Ceylon not included).
n.a. Not available.

UNITED STATES IMPORTS* OF RUBBER FROM FAR EASTERN AREAS
(IN LONG TONS)

Country	1st Half, 1946	3rd Quarter, 1946	October 1946	November 1946
British Malaya	50,666	51,450	36,303	35,673
Netherlands India	†3,982	11,066	5,632	6,167
French Indo-China	25,848	24,625	....	13,659
Ceylon	17,937	....	....	....
Siam	....	3,206	....	1,593
Burma	747	950	....	....
Philippines	423	205	....	‡254
Japan	....	....	....	....
Other countries	25,982	6,503	4,256	1,540
TOTAL‡	125,585	98,005	46,196	58,886

* General imports.
† Includes 649 tons of latex.
‡ Includes relatively small amounts of latex or milk of rubber.

In connection with reports from foreign service officers it was mentioned that in Canada natural rubber has been exempted from import restrictions, but import controls remain on synthetic rubbers of the neoprene, Butyl, and butadiene-styrene copolymer types and their latices.

Lever Bros. interests are expanding rubber plantations founded in the Belgian Congo during the war years. Two plantations covering 5,300 acres have been started in the northwestern part of the Congo, and an additional 6,400 acres are in the process of being planted.

From January through November 1946, 26,916,392 kilograms (26,400 tons) of rubber were shipped from Brazilian ports as compared with 27,173,263 kilograms (26,600 tons) in 1945. All of the 1946 shipments went to the United States except 13,290,639 kilograms (13,000 tons) of Brazilian origin shipped to southern Brazil. The total rubber production of Latin American countries other than Brazil for 1946 was estimated at more than 13,000 tons. Mexican shipments are indicated by the United States imports of guayule of 4,850 tons in eleven months.

In the first ten months of 1946, a total of 161,737 long tons of rubber was exported from Netherlands India. Of that total, 32,491 tons were shipped to the United States; 7,759 to Holland; and the remainder to Malaya. The rate of shipments has averaged 23,000 tons monthly since mid-year. A table of shipments in long tons from the Netherlands East Indies follows:

Period	Exports to U.S.	Exports to Europe	Imports into Malaya	Total
First Quarter	1,832	....	18,584	20,416
Second quarter	7,326	920	41,040	49,207
July	4,553	....	17,963	22,516
August	5,002	....	16,699	21,701
September	8,559	2,296	13,337	24,172
October	5,238	4,543	13,944	23,725
November	2,851	....	15,084	.....

Size and source of Malayan imports from Netherlands India in long tons from July through November follow:

Month	Sumatra	Borneo	Other Islands
July	15,058	1,907	998
August	14,099	1,605	995
September	11,443	1,122	772
October	12,523	614	807
November	12,942	1,515	627

Industry Activities and Outlook

The Rubber Manufacturers Association, Inc., stated on January 13 that arguments supporting continuation of present tariffs on products of the mechanical goods, footwear, and drug sundries branches of the industry have been filed with the State Department. They were directed to the Committee for Reciprocity of Information for use in connection with the hearings which opened on January 13 as a prelude to reciprocal trade agreement negotiations with several countries that will be conducted by the State Department in April. Maintenance of present tariff levels, in some cases, and restoration of the higher tariff levels which existed prior to reciprocal trade agreements, in other cases, were requested.

The briefs set forth that the value of products manufactured in these branches of the industry approached the half-billion-dollar mark in 1945. In the mechanical goods division alone, sales value of end-products was estimated at nearly a quarter of a billion dollars, and it was noted that production requirements of this division afforded jobs for more than 70,000 American workers.

Appeals for tariff extension were based on the grounds that the industry has encountered substantial increases in both labor and component materials costs since the present tariff rates were established, and that any reduction would place the industry at a serious competitive disadvantage with historically low-cost and low-wage producers in foreign countries.

Labor costs here were shown to be up 81% in mechanical goods since 1937; up 167.5% in footwear since 1932; and up 71% in drug sundries since 1941. Average cost of rubber has risen from 14.7¢ per pound in 1938 to 22¼¢ per pound today [25¾¢ per pound as of January 13]. Cost of some textiles used by manufacturers of mechanical goods has risen more than 300% since 1937. Chemicals and other components used by manufacturers of druggists' sundries were shown to have climbed as much as 80%.

Also noted were earlier findings of the tariff commission that import duties — even in the era of low-production costs in the early 1930's — were required to protect these branches of the industry from a ruinous flood of goods from factories in the low-wage centers of Japan, India, and Central Europe. For example, it was pointed out that wage scales have always been substantially higher in this country. While current figures on rates abroad are not available, it was noted that the Japanese average for all industrial workers was only 52¢ a day in 1939. In Czechoslovakia, a large producer of footwear, the average industrial wage in that year was only 64 1/3¢ a day.

Litchfield on Outlook

Mr. Litchfield offered further comment on the achievements of the industry during 1946 and the outlook for 1947 in a statement made in late January. The rubber industry, in the year just closed, enjoyed many all-time records in production and sales, he stated.

The needs of the rubber-starved public and industry have as yet not been fully filled so that the 1947 outlook is for rubber consumption again to be in the neighborhood of 1,000,000 long tons, of which natural and manufactured rubber may be in about equal proportions.

Unit replacement tires were approximately 55,000,000 in 1946, as compared with 33,000,000 average for the years 1939-41. Backlog needs as yet have not been satisfied, but more normal conditions are expected by the second quarter of 1947. Replacement demand in 1947, including some restoration of dealers' stocks, should approach 40,000,000 passenger-car tires.

With five each required for a possible 4,000,000 new-car production in 1947, together with an increase in tire manufacturers' stocks, production of passenger tires should fall between 60-65,000,000, as compared with 66,500,000 in 1946.

The great increase during the war in truck transport of war goods to and from industry, at high speeds, over long hauls and with considerable overloading, resulted in a replacement demand in 1946 of about 10,500,000 truck and bus tires, as compared with 5,500,000 in 1941 and 4,300,000 in 1940.

The important and rapidly expanding market for tractor and implement tires is reflected in current production as compared to prewar as follows: 1940, 1,488,000 units; 1941, 2,102,000 units; and 1946, 4,600,000 units.

The swift and sweeping conversion of the rubber industry to the production of planes, guns, ammunition, and other war products in the days prior to and following Pearl Harbor was matched by the swiftness of the industry's reconversion to peacetime production following VJ Day. No other large industry has matched the record of reconversion which is reflected in the following figures of tire production:

Type of Tire	Year 1941	Year 1946	% Increase
Passenger	50,000,000	66,500,000	33
Truck-Bus	11,700,000	15,800,000	35
Farm	2,100,000	4,800,000	128
Airplane	170,000	260,000	53
Total	63,970,000	87,360,000	36

The current level of production is at an all-time peak rate of 76,000,000 passenger-car tires annually and 17,000,000 truck tires. For all tires, the annual rate is approaching 100,000,000. The rubber industry may be the first of the durable goods industries to satisfy the replacement famine, Mr. Litchfield said.

Present production levels are not expected to continue throughout the year. However new products such as sponge rubber, rubber films, and plastics are expected to make up the gap when tire production falls off. The supply of natural rubber probably will catch up with the demand some time during 1947 so that the outlook is for lower prices on both natural rubber and synthetic rubbers later on in the year.

To sum up, Mr. Litchfield concluded, the outlook for 1947, a very satisfactory year is expected in volume of goods produced and sold if no serious interruptions occur in factory operations.

Smith on Textile Use

Herbert E. Smith on January 27 called attention to the fact that the rubber industry consumed more textiles in 1946 than in any other peacetime year in its history. The outlook for 1947 is for continued consumption at this same record-breaking rate, he stated.

Next to rubber itself, textiles are the most important raw material used in the manufacture of rubber products. A pound of textiles is used with every three pounds of rubber. The greater percentage of the industry's textile requirements will be for tire cord. While the use of cotton tire cord is decreasing in favor of rayon, continued heavy production of cotton yarns and fabrics required in the manufacture of rubber footwear, raincoats, belting, hose, and hundreds of other products is expected. Most of these products contain cotton, and there is no disposition to switch to another textile. Moreover all tires are built with cotton chafer fabric, the material which takes up the friction between tire and rim. The tire industry in 1946 used more than 50,000,000 pounds of cotton for this purpose.

U. S. Rubber is placing strong emphasis on textile research, Mr. Smith said and mentioned several of the new textile products of this company, recently placed on the market. In addition to making mechanical changes needed to produce these new fabrics and yarns, it has been necessary to survey market, secure personnel, and identify these products in the textile trade, it was pointed out.

RMA Tire Report

According to the monthly report of the RMA, passenger-car tire production declined slightly in November, dropping 7.45% from October's record output of more than 6,666,000 units. The decline was attributed by the RMA to the fact that November was a shorter month and that substantial production was lost on the Thanksgiving holiday. The complete report appears in the table which is at the bottom of this page.

CPA Statistics

According to the report of the CPA Rubber Division (now Office of Temporary Controls), synthetic rubber production during November was 58,655 long tons in government plants and 1,660 tons in private plants, which together with 894 tons imported, gave a total new supply of 61,209 long tons. Consumption of synthetic rubber in U.S.A. was 57,486 tons, and 1,781 tons were exported, leaving a stock on hand of 113,874 tons. Synthetic rubber was consumed during November according to types as follows: GR-S, 46,722 tons; neoprene, 4,182 tons; Butyl, 6,038 tons; and nitrile rubbers, 544 tons. Natural rubber consumption for the same period was 37,296 tons, and reclaimed rubber was used to the extent of 24,648 tons.

Management-Labor Relations

Negotiations between the United States Rubber Co. and the United Rubber, Cork, Linoleum and Plastic Workers of America, CIO (usually called URWA), were continued during January and resulted in the signing of an agreement on a company-wide basis, effective January 27. Negotiations between the Goodyear Tire & Rubber Co. and the above union on a similar company-wide contract began in Cleveland, O., early in January. Portal pay claims were filed against several rubber companies during the month. Discussion of the URWA's demand for a 26¢-an-hour wage increase began in Cincinnati, O., on January 27.

New U. S. Rubber Contract

The first company-wide contract in the American rubber industry was agreed upon during January in Cincinnati between U. S. Rubber and the URWA. About 30,000 workers in 16 plants from Rhode Island to California are affected. The contract, which will become effective when supplementary agreements are executed in the various plants and will run until July 1, 1948, does not cover the wage question. The plants included in the agreement are at Chicopee Falls, Mass.; Eau Claire, Wis.; Philadelphia, Pa.; Los Angeles, Calif.; Naugatuck, Conn. (2); Mishawaka, Ind.; Detroit, Mich.; Indianapolis, Ind.; Passaic, N. J.; Woonsocket, R. I.; North Bergen, N. J.; Washington, Ind.; Bristol, R. I.; and RFC plants operated by U. S. Rubber at Institute, W. Va., and Naugatuck, Conn.

The central office of the union will appoint a special representative to work in cooperation with the local unions in the administration of the provision of the agreement. The contract includes provisions for check-off of initiation fees, monthly dues, rejoining fees, and general assessments for union security. Under company security it is stated that:

"The Union recognizes the responsibilities imposed upon it as the exclusive bargaining agent of the employes and realizes that the Company, in order to provide maximum opportunities for steady continuing employment, good working conditions and good wages, must be in a strong competitive position which means that it must produce efficiently and at the lowest possible cost consistent with fair labor practices. The Union agrees to cooperate in the attainment of these goals.

"The Union realizes the necessity of encouraging full productivity commensurate with fair labor practices and agrees that it will cooperate with all levels of supervision in discouraging any practice which imposes any unreasonable restriction on production, and it further agrees that it will support management in its efforts to improve production, establish efficient methods, eliminate waste in production, conserve materials and supplies, improve quality of workmanship, and strengthen good will between the Company, the employes, the consumers, the Union and the public.

"The Union agrees that it will not en-

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, and Inventory—November-October, 1946—First 11 Months 1946 and 1945

	Original Equipment	Replacement	Export	Total Shipments	% of Change from Preceding Month	Production During Month	% of Change from Preceding Month	Inventory End of Month	% of Change from Preceding Month
Passenger Casings									
November, 1946	1,229,427	4,804,556	76,215	6,110,198	—11.67	6,169,875	—7.45	2,207,772	—2.55
October, 1946	1,393,954	5,474,354	48,992	6,917,300		6,666,470		2,265,435	
First 11 months, 1946	9,698,663	49,224,630	554,371	59,477,664		60,157,327		2,207,772	
1945	885,894	22,285,095	192,615	23,363,604		24,400,338		1,837,516	
Truck and Bus Casings									
November, 1946	426,741	856,863	91,644	1,375,248	—9.28	1,409,020	—8.39	817,921	+5.46
October, 1946	480,443	970,450	64,989	1,515,882		1,538,099		775,591	
First 11 months, 1946	3,751,389	9,744,572	740,800	14,236,761		14,338,131		817,921	
1945	4,720,612	10,350,339	246,629	15,317,580		15,298,345		677,014	
Total Automotive Casings									
November, 1946	1,656,168	5,661,419	167,859	7,485,446	—11.24	7,578,895	—7.63	3,025,693	—.50
October, 1946	1,874,397	6,444,804	113,981	8,433,182		8,204,569		3,041,026	
First 11 months, 1946	13,450,052	58,969,202	1,295,171	73,714,425		74,495,458		3,025,693	
1945	5,606,506	32,635,434	439,244	38,681,184		39,698,683		2,514,530	
Passenger Truck and Bus Tubes									
November, 1946	1,658,851	5,334,435	171,788	7,165,074	—16.04	7,642,523	—5.49	4,364,487	+6.25
October, 1946	1,882,247	6,538,256	113,140	8,533,643		8,086,567		4,107,859	
First 11 months, 1946	13,561,980	52,900,671	1,240,090	67,702,741		69,390,368		4,364,487	
1945	5,612,901	30,696,447	356,033	36,665,381		37,786,682		3,251,818	

courage, sanction, or approve any strike, stoppage, slowdown, or other interruption of work growing out of any dispute which is subject to the grievance procedure under the terms of this agreement and the supplements thereto. On the contrary, the Union will actively discourage and take whatever steps are necessary to prevent any strike, stoppage, slowdown or other interruption of work in violation of this agreement or the supplements thereto. Any strike, stoppage, slowdown, or other interruption of work in violation of this agreement or supplements thereto may result in discipline by the Company. The Company agrees that neither it nor its representatives will put into effect any lockout during the term of this agreement."

A five-step grievance procedure, which will refer the case to an impartial umpire as the fifth and final step, is part of the new contract. Time and one-half is to be paid for overtime work in excess of the regular 40 hours per week. Double-time is paid for work performed on Sundays or any of six legal holidays. In the establishing of piecework standards and wage rates, the union will be advised in advance as to what the rate will be, and the company will make available to the union for inspection complete data showing the basis upon which the rate is determined.

One-week vacation with pay after one year of service and two weeks' vacation after five or more years were agreed upon. As a general rule, the company will grant time off for vacations, but if it is necessary because of production requirements to grant vacation pay in lieu of time off, the matter will be discussed with the union before denying employes vacation time.

Equal pay for equal work is granted women workers. Under certain conditions severance pay will be paid workers. No employe will be discriminated against because of race, creed, or color. The company and the union will cooperate in maintaining and making effective safety and good housekeeping rules that will eliminate hazards and make the plant a safe and sanitary place to work.

Among the appendices attached to the new contract is a memorandum to the effect that in the event the negotiations on the general wage scale and the other matters covered by the March 2, 1946, Big Four agreement are terminated without conclusion on a four-company, Big Four basis, then the general wage scale and the other matters covered by the March 2, 1946, agreement shall be subject to negotiation on a company-wide basis between the United States Rubber Co. and the United Rubber, Cork, Linoleum and Plastic Workers of America, CIO.

Company officials signing the new agreement were E. M. Cushing, director of industrial relations, C. H. Parcells, company attorney, R. E. Lowell, J. S. Lynch, R. A. Donley, and W. E. Bradford. Union president, L. S. Buckmaster, H. R. Lloyd, vice president, and G. L. Patterson signed for the international union. Officials of all the 16 local unions of U. S. Rubber included in the agreement also signed.

The "Big Four" Wage Parley

After a meeting in Cleveland on January 3 to determine the time, place, and general conditions under which the companies and the URWA will negotiate the union's new wage demands, the conference on this subject began in Cincinnati on January 27. Representatives of Goodyear, Goodrich, Firestone, and U. S. Rubber companies met with representatives of the international union and of the various local unions concerned.

It was reported from Washington that the United States Labor Department's Conciliation Service would assign Paul W. Fuller, special conciliator for the rubber industry, to observe the Big Four-URWA wage negotiations.

Sentiment of some of the local unions was against any extension of the present wage contract as was done by the United Steelworkers Union, CIO, while discussing a wage increase. It was indicated that some of the local unions would insist on an immediate wage increase.

The URWA announced on February 4 that the wage conference had been adjourned for a period of 90 days at the companies' insistence. The union was not in favor of the adjournment and stated that it had "instructed local unions to prepare themselves in such a manner as to place themselves in a strong bargaining position."

Portal Pay Suits

The international office of the URWA advised local unions to discuss the matter of portal pay with their respective managements and urged caution in filing suits. Meanwhile in Akron, O., Stanley Denlinger, a former counsel of the international URWA, filed a portal pay suit against The B. F. Goodrich Co. for $23,625,000 and against the Goodyear Tire & Rubber Co. for $20,000,000. Also in Akron, it was reported that Firestone local No. 7 filed a suit against the Firestone Tire & Rubber Co. for $24,640,000 and then that Goodrich local No. 5 had filed a suit against the Goodrich company for $26,000,000.

The only other suit known was that filed by U. S. Rubber local No. 101, in Detroit, Mich. A suit against U. S. Rubber was filed some time ago by this local union for $7,000,000 for portal pay, it has been reported.

Miscellaneous Stoppages

A dispute over a new standard rate of pay for tire builders, at the Akron plant of the Goodrich company, on January 9, made more than 3,400 workers idle. The argument started over a new rate on a machine making an odd-size tire, the company explained. Goodrich officials said the new rate went into effect in accordance with its contract with local No. 5, URWA. Local union committeemen urged workers to return to their jobs pending negotiations, but the workers refused. No details of settlement are available.

Two thousand of 3,300 employes of U. S. Rubber's Passaic plant walked out on January 27 in protest against the suspension of a fellow employe for unsatisfactory work. The local union officials said that no strike had been authorized and that they would attempt to arrange a meeting with company officials. The company insisted that it would not discuss the matter, until the men returned to work. After a two-day strike, the employes returned to their jobs, and the matter was to be submitted to arbitration.

R-1 Revised

Rubber manufacturers no longer will be required to obtain permission to consume natural rubber, Butyl, and GR-S and thus will be free to determine what permitted products they will make from the quantities of these materials they obtain, CPA announced December 31, 1946. Authority to "accept" delivery of rubber, however, must still be obtained from the government agency, which also emphasized that manufacturers still may produce only rubber products specifically permitted by R-1 and must still observe the specifications listed in the order.

Manufacturers will still be required to obtain authorization both to accept delivery and authorization to consume natural rubber latex, which remains in extremely short supply. In granting "authorization to consume" CPA has had the authority to require that specified quantities of various rubber materials be consumed in specified end-products. This channeling has been dispensed with except for natural rubber latex.

In addition the revised R-1 now permits the use of natural rubber in cup caps and inflations for milking machines.

Hereafter the maximum inventory of any type of synthetic rubber, including synthetic latices, will be 45 days at the current production rate, compared with the former maximum of 30 days. Among other minor changes in the amended order is one which allows the use of 30% natural rubber in the manufacture of building wire.

Restriction on Natural Latex

Natural rubber latex now will be permitted in rubber cement used in some shoe manufacturing processes when specifically authorized by the CPA, that agency announced January 30. Because of the extremely short supply of natural rubber latex, permission for its use in cement for shoes must be limited to cases in which it is demonstrated that lack of this material is preventing the production of shoes of adequate quality. Estimated imports of natural rubber latex for 1947 will be only 40% of the estimated demands of the rubber manufacturing industry, according to W. James Sears, director of CPA's Rubber Division.

"Facilities and equipment for the production of natural rubber latex in the Far East were damaged or destroyed entirely during Japanese occupation of rubber producing areas," Mr. Sears said. "To restore normal production and increase it to meet current demand, large numbers of steel drums and ammonia cylinders must be provided. In addition, bulk creaming, handling and loading facilities are required.

"It will be many months before this equipment is in place in sufficient quantity to meet the increased demand of the rubber manufacturing industry. It is estimated that the 1947 demand for natural rubber latex is three times that of 1940," Mr. Sears further declared.

The amendment to R-1, effective January 30, provides that a shoe manufacturer requesting permission to use natural rubber latex cement must present his case on CPA Form 2242, including full details as to manufacturing operations and the technical reasons requiring the use of natural rubber latex in specific operations. When authorization to use natural rubber latex cement has been received, the shoe manufacturer may obtain the cement from a rubber cement manufacturer only by furnishing a written certification of authorization to consume. Manufacturers of natural rubber latex cement may not sell their product to shoe manufacturers who have not supplied proper certification.

Inventories of natural rubber latex will be kept under close control and use must be for the particular purpose for which authorization has been granted, Mr. Sears stated.

MIDWEST

Forms New Divisions

Formation in Seattle, Wash., of a western division as a major industrial unit to supervise continually expanding operations centered on the Pacific Coast was announced January 3 by Monsanto Chemical Co., St. Louis, Mo. The new operating division consists of four plants prominent in the manufacture of plywood glues, paint, and wood preservatives. One plant is in Los Angeles, Calif., and major plant sites are in Seattle, where a $2,000,000 three-year construction program is scheduled to start next spring. Included in the division are plants at Lockport, N. Y., and Portsmouth, Va. The four plants of the new division were the principal units of I. F. Laucks, Inc., operated by Monsanto as a wholly owned subsidiary since the merger in 1944.

Harry P. Banks, president of the Laucks organization, has been elected vice president of Monsanto and general manager of the western division, the fifth major operating unit of the company, which includes the organic chemicals and the phosphate divisions, both with headquarters at St. Louis; the Merrimac division at Everett, Mass.; and the plastics division at Springfield, Mass.

The Laucks organization was formed in Seattle in 1920 and expanded steadily through original research and development of industrial glues beginning with the development of soybean glues and continuing to the modern glues used in the manufacture of plywood. The company also developed a line of paints and wood preservatives.

To meet increased postwar demands Monsanto will begin construction next spring of the first $1,000,000 unit in a Seattle construction program. This unit will include two masonry structures for the manufacture of soybean glues and wood preservatives.

In addition to the four plants forming the new division, Monsanto acquired in 1944 Laucks' interests at Vancouver, B. C., Stanbridge, P. Q., both in Canada, and other holdings in Australia and Sweden. The additional Laucks plants are merged with other operating units of the company, Monsanto said.

Monsanto has also formed a Texas division with headquarters at Texas City and Joseph R. Mares general manager of the new manufacturing unit. The 50,000-ton-capacity styrene plant at Texas City, which Monsanto purchased from the War Assets Administration in August, 1946, for $9,550,000, will form a nucleus for the new manufacturing division, Monsanto said. Production of the first polystyrene plastic at Texas City is expected shortly, and plans already are under way for further Texas expansion. The Texas City plant, operating at full capacity since the end of the war, was designed, built, and operated for the government by Monsanto. It supplied about 25% of the styrene required for the synthetic rubber program.

Styrene, when polymerized alone, becomes a glassy, transparent solid known as polystyrene. It is marketed by Monsanto under the trade name "Lustron" and is used to manufacture countless molded articles such as electrical fixtures, toilet articles, novelties, toys, and other plastic fabrications.

A polystyrene plant to produce the plastic molding powder is being installed at Texas City in buildings formerly owned by the Texas Sugar Refining Co. adjacent to the styrene plant. The sugar refinery buildings and grounds, which have not been used since 1933, were purchased by Monsanto five years ago along with the styrene plant site. H. K. Eckert, Texas City plant manager, said the plastics plant is expected to provide additional employment for approximately 75 persons. The styrene operation employs more than 500.

When production of polystyrene gets under way, it is believed that it will mark the first instance of plastic manufacture in the State of Texas.

Mr. Mares, a native of Helena, Mont., has been director of Monsanto's development department since 1943. A graduate of Massachusetts Institute of Technology, he is also a member of the bar of the State of Missouri and has been in the employ of Monsanto since 1929. Mr. Mares belongs to the American Chemical Society, the American Patent Bar Association, the American Bar Association, and the Missouri Athletic Club. He is married and has three children.

Promotions by Monsanto

Appointment of Robert B. Semple as director of the general development department was also announced recently by Monsanto in naming several major promotions in company management. Mr. Semple is succeeded as petroleum chemicals sales manager by John Wade Newcombe of the petroleum sales department.

Osborne Bezanson, vice president and general manager of the organic chemicals division, named William G. Krummrich as assistant division general manager. Mr. Krummrich's former post, division production manager, has been assigned to David L. Eynon, Jr., assistant to the division general manager and acting plant manager of the company's Nitro, W. Va., unit.

A native of St. Louis, Mr. Semple attended Massachusetts Institute of Technology, where he received a B. S. in chemical engineering in 1932 and a master's degree in chemical engineering the following year. Following graduation, Mr. Semple joined Monsanto as a research chemist in the organic division in St. Louis. In 1934 he served as a pilot-plant chemist and from 1935 to 1939 as a pilot-plant group leader. In 1939 he became assistant director of the general development department at St. Louis and was named petroleum chemicals sales manager in 1944.

Mr. Newcombe, a native of Hoagland, Md., was graduated from De Pauw University in 1930 and was with the Indiana State Highway Commission and the D-A Lubricant Co., both of Indianapolis, before joining Monsanto on May 1, 1944.

Mr. Krummrich, a native of Belleville, Ill., worked his way to a key Monsanto position in a career which began after only one year of high school. He went to work in a stove foundry and studied business courses in night school and chemical engineering while a member of the Belleville Fire Department. He joined Monsanto in 1917, doing analytical work in the laboratory of the John F. Queeny plant in St. Louis and rose to operating superintendent of the plant in 1935. He was transferred the next year to the Monsanto, Ill., plant as manufacturing superintendent and was made plant manager about four years later. In 1943 he became production manager of the organic division.

Mr. Eynon, a native of Paterson, N. J., came to Monsanto in 1933 in the research department of the Merrimac division. During the war he was plant manager of the government-owned Longhorn Ordnance Works at Karnack, Tex., which was operated by Monsanto's organic division. He was educated at Williams College and M.I.T.

Dan J. Forrestal, Jr., former assistant to the president of Parks Aircraft Sales & Service, Inc., on January 10 became assistant to the director of industrial and public relations at Monsanto. Before joining Parks, Mr. Forrestal was with the *St. Louis Globe-Democrat* for 19 years, serving as assistant managing editor for five years.

Carl F. Graesser, made sales manager of thermosetting molding materials for the plastics division, will be in charge of sales of Resinox and Resimene molding compounds. He is succeeded as assistant sales manager of thermosetting molding materials by C. L. Richards, Jr., formerly branch manager of the division's St. Louis office. That post has gone to T. J. Martin, formerly a salesman in the division's Connecticut territory. Appointment of W. H. Face as assistant to the sales manager of thermoplastic folding materials also was announced.

Paisley Products, Inc., 1770 Canalport Ave., Chicago 16, Ill., through Sales Manager Earl G. Lenz has announced the purchase of Lignotite Co., 882 Milwaukee Ave., Chicago 22. The purchase included all formulae, manufacturing processes, technical and customer records, and supplies. Lignotite Co., engaged in the manufacture of casein glues since 1910, had pioneered in the development of wood preservatives. All manufacturing of Lignotite products will be done at Paisley's recently improved Chicago plant. According to Mr. Lenz, the consolidation of the Lignotite products with the present Paisley series of synthetic resin and rubber emulsions, animal glues, and dextrine products will provide a well-rounded adhesive and related chemical line for all industrial fabricating, gluing, combining, and packaging operations. The 14 sales offices of the Paisley Co. will be used to service Lignotite products, and further expansion of the sales staff is contemplated in the near future.

Minnesota Mining & Mfg. Co., St. Paul, Minn., will erect a one-story rubber-cement plant at Garfield Ave. and Randolph St., Los Angeles, Calif. The two reinforced concrete structures will consist of the cement factory 100 by 200 feet and a mixing plant 100 by 50 feet. Cost of the project will be approximately $130,000.

The Dow Chemical Co., Midland, Mich., has made personnel changes in New York and Chicago. Frank L. Brown, of the New York office, takes over supervision of plastics sales in the eastern region, which includes the Boston, New York, and Philadelphia offices. Gage Olcott is in charge of plastics sales in the New York office. In Chicago, Joseph E. Russell directs plastics sales in the midwestern region, which includes the Cleveland, Detroit, Chicago, and St. Louis offices. Floyd J. Gunn heads the plastics sales staff of the Chicago office.

EASTERN AND SOUTHERN

Okonite Advances Keefer

R. S. Keefer, formerly sales manager, has been appointed vice president in charge of sales and will be responsible for directing all sales activities of The Okonite Co., manufacturer of electrical wires and cables, Passaic, N. J., and its Hazard Insulated Wire Works Division, as well as those of its affiliate, The Okonite-Callender Cable Co., Inc.

F. E. Bankwitz has been made manager of Okonite's Washington office, 550 Munsey Bldg., 1329 E. St., N. W., Washington 4, D. C., to replace R. Soutter, who has been granted a leave of absence effective March 1.

On January 1, D. W. Nurse, formerly of the San Francisco office, became manager of Okonite's Portland office, 907 Terminal Sales Bldg., 1220 S. W. Morrison St., Portland 3, Oreg.

On January 2, W. R. Van Steenburgh was made manager of Okonite's New York territory, with headquarters at 501 Fifth Ave., New York 17, N. Y. This appointment is in addition to his duties as manager of the company's light and power department.

Okonite's Hazard Insulated Wire Works, Wilkes-Barre, Pa., is now producing and distributing aluminum building wire to alleviate the copper shortage. The National Electrical Code for many years has recognized and approved aluminum for electrical conductors, but, until very recently, the higher current carrying capacity of copper as compared with aluminum has militated against the general use of the latter for insulated wires and cables. Wire manufacturers have now solved this economic problem by taking advantage of the increased current loadings made possible by the use of modern heat-resisting rubber insulation which can withstand high operating temperatures. Previously, in the bulk of building wire, the copper conductors have been insulated with Type R rubber insulation rated at 60° C. Now, by protecting an aluminum conductor with Type RH heat-resisting insulation, rated at 75° C., there is no need to increase the conductor area since the higher rating of the insulation fully compensates for the lower current carrying capacity of the aluminum (84% that of copper). The Hazard Division advises that there is little or no difference in price between the two types of wire since the higher cost of the better insulation is at least offset by the lower cost of aluminum. The company can supply aluminum building wire in all sizes to 1,000,000 c.m., starting at size 12, and made with ordinary strandings. All dimensions and finishes remain the same as for copper building wire.

Okonite is also producing aluminum conductors for its custom-built line of electrical wire and cables, partially for power applications. Other applications for aluminum conductors lie in the field of aerial cables where weight savings are more important than in conduit installations.

Acme Backing Corp., Meadow and Bogart Sts., Brooklyn 6, N. Y., has incorporated into its expanded technical department all activities and personnel of Affiliated Research, Inc., formerly at 239 E. 44th St., New York 17, N. Y.

Enjay Co., Inc., Formed

Organization of Enjay Co., Inc., 26 Broadway, New York, N. Y., to take over the sale and distribution of all products formerly handled by the chemical products department of Stanco Distributors, Inc., and by the Standard Alcohol Co., was announced last month by H. W. Fisher, president of the new company. This organization, a subsidiary of Standard Oil Co. (N. J.), began functioning January 1. Enjay will handle the national and export marketing of numerous products based on synthetic chemicals derived from petroleum, as distinguished from regular petroleum products such as gasoline and lubricating oils.

Officials of the new company, in addition to Mr. Fisher, are John A. Britton, Jr., and James G. Park, vice presidents; W. F. Quick, secretary; H P. Schoeck, treasurer; G. M Buckingham, assistant secretary; and L. R. Moore, assistant treasurer. In the past Standard Alcohol marketed various synthetic alcohols and related products, with Mr. Parks as vice president and general sales manager. Stanco's chemical products department marketed synthetic rubbers and lubricant additives under the direction of Mr. Britton. Under the new arrangement, Mr. Park will be vice president and general sales manager of alcohols and related products, with W. V. Rathbone as assistant sales manager. Perbunan and Vistanex rubbers will be handled by Mr. Britton, with I. E. Lightbown as assistant manager. Paramin lubricant additives are also under Mr. Britton's supervision, with A. Bruce Boehm as assistant manager.

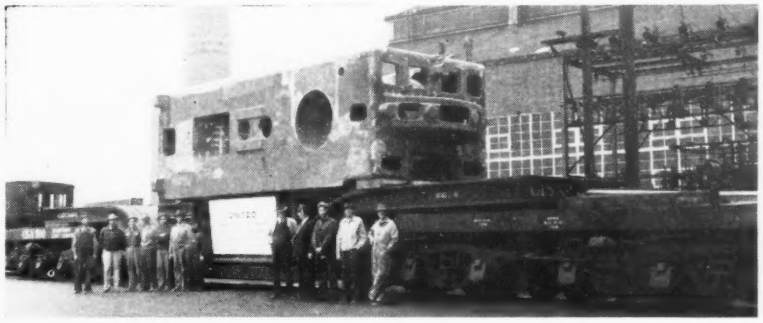
Great expansion in the field of synthetic chemicals derived from petroleum occurred during the war, and even bigger things are ahead, the company believes. The present move is largely in anticipation of greatly expanded development and marketing activities among the products handled by Enjay.

United Engineering & Foundry Co., Pittsburgh, Pa., recently completed what is reputed to be the world's largest steel machinery casting. Made in United's New Castle plant for the Ajax Mfg. Co., Cleveland, the casting weighs 472,000 pounds and will be used as the frame for a 6,000-ton capacity high-speed mechanical forging press. The pattern for the huge casting, made by the Eclipse Pattern Co., Pittsburgh, required more than 30,000 feet, or almost a full carload of lumber; 500 pounds of nails; and 10 gallons of lacquer. More than 2,500 man-hours of labor were required to build it. A special 90-foot freight car with 12 wheels at each end was required to carry the casting. As the total weight of the casting, car, and blocking was more than 800,000 pounds, a special train was made to transport the unusual cargo and consisted of an engine, three empty flat cars, and the loaded car. Movement of the train was also restricted to daylight, and then at a speed of only 10 miles per hour.

Binney & Smith Co., manufacturer, exporter, and importer of blacks, colors, clays, chemicals, and talc, 41 E. 42nd St., New York 17, N. Y., has announced that Binney & Smith, Ltd., 33 Edward St., Toronto, Ont., Canada, is now headed by Elmer G. Croakman, and that the concern will also have a Montreal office to handle accounts in that territory. L. H. Blanchford, of Montreal, has handled Binney & Smith, Ltd., business for several years, and the change was made only because Binney & Smith feels that Canadian business has reached such a volume and will continue to do so that the company needs an office in Canada devoting full time to Binney & Smith products.

Mr. Croakman was graduated from the University of Buffalo, N. Y., with a chemical degree, in 1918. From then on until 1926 he was with the National Aniline & Chemical Co., conducting research on dyestuffs, intermediates, oil soluble colors for rubber, and rubber chemicals. Next he went to Akron to become assistant chief chemist at Philadelphia Rubber Works Co. and later became salesman for the Canadian territory for reclaimed rubber. In later years Mr. Croakman at various times covered other territories, but always retained the Canadian section.

Walter E. Scheer has formed Scheer Chemical Co., Inc., 60 E. 42nd St., New York 17, N. Y., to act as manufacturers' agent and technical sales and market development consultant for chemical manufacturers in the fields of plastics and plasticizers, surface active agents, and fine chemicals. Mr. Scheer had been employed by the Commercial Solvents Corp. for a number of years in market development and technical sales capacities and for the past several years had been vice president of Amecco Chemicals, Inc., as well as assisting in the work of Amecco's affiliate, the Hardesty Chemical Co., Inc.



World's Largest Casting, Made by United Engineering & Machinery Co., Ready for Shipment on Special Freight Car

U. S. Rubber Expanding; New Appointments

To supply the rapidly growing rubber business on the Pacific Coast, Naugatuck Chemical is opening its own branch office, with 15,000 square feet of floor space at 19201 S. Vermont Ave., Los Angeles, Calif., according to W. J. Geldard, manager of rubber chemicals at the headquarters of United States Rubber Co., Rockefeller Center, New York, N. Y.

This new branch will be the West Coast headquarters for the sale of all Naugatuck chemicals, including rubber chemicals, latex and Lotols, Dispersite, agricultural chemicals, aromatics, plastics, and resins. It will also have equipment for preparation of Lotols and the drumming of natural and synthetic latex.

J. Raymond Morath will be branch manager in charge of the new office. He will be assisted by Curtis Wolter on agricultural chemicals and Henry Reardon on aromatics. Mr. Morath was the Naugatuck representative in the Chicago area for the past decade.

"We are convinced that the potentialities for industrial development on the Pacific Coast are great," said Mr. Geldard in making the announcement. "The rapid growth of the rubber business in this area now demands the establishment of our own headquarters in Los Angeles."

He noted that the list of rubber companies on the West Coast has grown to 140.

U. S. Rubber has acquired an interest in the North British Rubber Co., Ltd., of Edinburgh, Dumfries, and London, it was announced January 27 by Herbert E. Smith, president of the American company. Terms of the agreement between the two companies provide that the North British company will manufacture goods for U. S. Rubber's British subsidiary, Dominion Rubber Co., Ltd., for resale in and export from Great Britain. Arrangements have been made for a substantial and increasing participation by U. S. Rubber in the common stock of the North British company. Under the agreement close cooperation will exist between the two companies in Great Britain. The British concern will be entitled to full technical assistance and participation in the benefits of the American company's research and development program.

U. S. Rubber is erecting a two-story reinforced concrete structure, with reinforced brick filler walls, at 5675 Anaheim-Telegraph Rd., Los Angeles, Calif., adjacent to the tire plant there. The new building, which will provide 180,000 square feet of floor space, will be used as a central distributing warehouse, used primarily for tires and tubes. Cost of the project is reported as $896,000.

Changes in Personnel

Mr. Geldard also announced that David E. Welch is joining the sales department of Naugatuck Chemical. Mr. Welch recently completed three years with the Office of Rubber Reserve, Washington, D. C., where he was manager of the finished products unit and became widely known among consumers of synthetic rubbers. Before that he had been employed by The B. F. Goodrich Co., Akron, O. A graduate of Brown University, Mr. Welch is a native of Dansville, N. Y., where he attended Central High School.

O. L. Ward has been appointed superintendent of the Gastonia, N. C., plant of U. S. Rubber, and Donald Carroll succeeds him as superintendent at Scottsville, Va. Mr. Ward succeeds Don Maddox, superintendent of the Gastonia plant before its recent purchase by the rubber company from Ruby Cotton Mills, Inc., who resigned to pursue other interests.

Mr. Ward has been associated with the rubber company since 1936. He started as an apprentice in Hogansville, Ga., and after six months was given a job in the time-study department. Later he became industrial relations manager and then assistant plant superintendent at Shelbyville, Tenn. In 1944 he became superintendent at Scottsville.

Mr. Carroll began his textile career in 1933 at the company's Shelbyville plant as a laboratory technician, but advanced to technical supervisor. Later he was technical supervisor at Hogansville and then Winnsboro. He was transferred to New York in 1943 as assistant to R. C. Harrington, technical director of the textile division, and has been specializing in the development of rayon tire cord.

Mr. Carroll's former duties will be turned over to Leonard D. Swearingen, transferred to New York from New Bedford, Mass., where he served as technical supervisor. Mr. Swearingen in 1931 received a degree in textile engineering from Clemson College. He started with U. S. Rubber at Winnsboro in 1931 and subsequently became technical superintendent of the plant. He went to New Bedford in 1940, when the company acquired the Fisk tire cord mills there.

Mr. Swearingen's position in New Bedford will be filled by Louis M. Boulware, who has been transferred from Scottsville, where he was technical supervisor. Mr. Boulware began his textile career at Winnsboro in 1938 after graduation from Clemson College. He joined the Armed Forces in 1942 and served overseas as an Army captain. He had been technical supervisor in Scottsville since his return from Army service in March, 1946.

A new branch office and warehouse building was opened January 13 at 1480 N. Thomas St., Memphis, Tenn., by the company to improve distribution of its products in that area. The building is of one-story, brick construction and contains 45,000 square feet of office and storage space with additional room for future expansion. Offices are soundproofed and air-conditioned. The warehouse is completely mechanized and has wide aisles for the movement of industrial tractors. Merchandise may be loaded and unloaded from a railroad siding and spacious truck platform. The Memphis branch services portions of Tennessee, Arkansas, Mississippi, Alabama, and Louisiana. Memphis, one of 37 cities in this country in which U. S. Rubber distributing branches are located, is also the home of the company's cotton buying office.

B. J. Brady continues as branch operating manager at Memphis. F. C. Tucker is U. S. Tires district manager there, and A. M. Petersen is Fisk tires district manager. Mr. Petersen last month was transferred from Dallas, and his territory now includes that of the Memphis branch as well as portions of Kentucky and Texas.

Joseph W. Devorss has been appointed sales engineer in the Washington, D. C., office of U. S. Rubber, succeeding Edwin D. Meade. Mr. Devorss was born in St. Joseph, Mo., and educated at Massachusetts Institute of Technology. He began his rubber career in 1938 and has been located at the rubber company's general offices in New York, specializing in the development of rubber insulators to dampen noise and vibration on mechanical equipment.

Mr. Meade becomes manager of railway sales at the Chicago branch; while L. Phil Haser, who has handled the company's railroad sales in the Chicago district since 1903, will serve in a consulting capacity to Mr. Meade. Mr. Haser is well known in railroad circles as the dean of mechanical rubber goods salesmen. He frequently serves as an adviser to railroad engineers in connection with rubber parts used on railroad equipment.

Mr. Meade was born on Long Island and educated at William & Mary College. He has been with the rubber company since 1935, when he started as a clerk in the New York branch and became a salesman a few months later. He was assigned to Washington in 1941.

Arthur J. Hocking has been named manager of sales promotion in the footwear division of the rubber company, to be responsible for all promotional activities of the division, including displays of every type, packaging, movies, sales booklets, and special activities at point of sale. Mr. Hocking brings to his new position a wide experience in the field of style and design. He has been associated with the company since 1943, most of which in product development at the Naugatuck footwear plant.

C. A. Ostrom has been appointed manager of the sales operating department of the company's tire division. Since joining U. S. Rubber in 1911, Mr. Ostrom has held many administrative positions in the tire division. For the past several years he was sales operating department manager for U. S. Tires, in which capacity he has been succeeded by F. J. Franzel, formerly in charge of the sales service section of the U. S. sales operating department. Affiliated with the company since 1929, Mr. Franzel has held various auditing and sales positions at the Detroit plant and general office in New York.

Fred S. Carpenter has been appointed director of manufacturing, Eugene J. Dailey, assistant director of manufacturing, and Edward J. Higgins, director of development for United States Rubber Export Co., Ltd., it was announced last month by L. C. Boos, president and general manager of the export company.

Mr. Carpenter, who will be in charge of all factory activities for the export company, has been with U. S. Rubber since 1913 in various engineering, chemical, tire division, and export company positions. He had been general manager of the tire division and also factory manager of the Los Angeles tire and synthetic rubber plants. Recently he was a member of a survey party to Sumatra to inspect the company's rubber plantations. He is a graduate of Worcester Polytechnic Institute and served in World War I.

Mr. Dailey was graduated from Iowa State College and joined the export company last year following wartime experience at U. S. Rubber's ordnance plants in Des Moines and Milwaukee. He was assistant chief process engineer and later assistant technical director at the plant.

The position of director of development is a new post created for the supervision of technical activities associated with the company's overseas manufacturing as well as product and process development. Mr. Higgins was formerly with the development department of the Fisk tire plant, Chicopee Falls, Mass. He has been with the export company since 1944 and has served as its assistant director of manufacturing. He is a graduate of Renssalaer Polytechnic Institute.

J. W. Timmons has been named manager of Fisk farm tire sales. He had been territorial representative for Fisk in the area embracing Buffalo, N. Y., and previously had served as special farm tire representative in Texas, New Mexico, and Oklahoma, where he gained wide experience in the tractor and implement tire field. He will make his headquarters at the company's general offices in New York.

Product Developments

A new type of laminated plastic sheeting, developed by U. S. Rubber for shoe manufacturers, is now in production for immediate delivery. Known as U. S. Naugahyde Shoe Material, it is suitable for use as quarter linings, sock linings, heel pads, facings, and trim on shoes. It is available in the standard shoe colors of water lily, fawn, tan, light gray, and dark gray and in 0.030, 0.025, and 0.020 gages. The surface finish is skiver grain, with a semi-dull sheen. The sheeting is 36 inches wide for economical pattern layout and is uniform in quality to permit the laying out of tiers which can be cut as one. It is said to be pliable, easy to form and apply, and non-tacky, and will not soften, stretch, harden, or crack with use. Other claimed advantages are that it can be cleanly cut, showing no fraying at the edges, and has sufficient strength to be free from stitch tearing. It can be easily printed or stamped, and the ink is said to be permanently embedded in the sheeting.

Fleet delivery tires designed especially for start-and-stop delivery service are again available for the first time since the war. The postwar delivery-type tires now being manufactured by U. S. Rubber are of rayon cord construction. Their treads are deeper to stand up under abrasive wear, and shoulder buttresses have been made especially strong to resist chafing against curbs. The tires are said to be ideal for vehicles which make frequent stops in delivery services, such as trucks operated by groceries, laundries, bakeries, dairies, and department stores.

Rubber jar rings are becoming popular as bracelets in Africa, according to information received by the New York offices of U. S. Rubber. Natives in the Cape province, unable to obtain brass wire to make metal adornments, are buying the black and red jar rings by the thousands. United States Rubber Export Co. has sold more than a half-million rings for adornment during the last 12 months, and the demand is expected to continue at a high level. This drain on the jar ring supply will not handicap domestic users because there are enough rings being produced for both canning and fashion.

Florida Rubber Corp., Miami 38, Fla., suffered the loss of its plant by fire on January 2, with estimated damage of at least $250,000. The plant, which makes rubber soles and heels, was built in 1945 and had been operating 24 hours a day until the night of the fire. Company officials hope soon to resume manufacturing operations in a new location.

Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York 17, N. Y., has announced that A. H. Tenney has returned to its New York offices as a technical representative for the fine chemicals division He will specialize in the development of markets for new chemicals being developed by the research laboratories Dr.

A. H. Tenney

Tenney recently completed 3½ years with the Manhattan Project at Oak Ridge, Tenn., and previously had been associated with Carbide & Carbon in a sales development capacity.

Neoprene GR-N for Sale

War Assets Administration has for sale 225,000 pounds of neoprene in 50-pound cardboard cartons. Condition—unused. For further information write to Chemicals Section, War Assets Administration, P. O. Box 2090, 1955—50th St., North, Birmingham, Ala. Inspection is invited, or a sample will be supplied on request on company letterhead.

RMA Elections

Election of H. S. Marlor, vice president of the United States Rubber Co., New York, N. Y., to the board of The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, and the reelection of six other directors were announced by the Association on January 8. Mr. Marlor succeeds F. B. Davis, Jr., chairman of the board of U. S. Rubber, on the Association's directorate. Five members reelected for terms expiring in 1949 were: George B. Dryden, president, Dryden Rubber Co., Chicago; E. B. Germain, president, Dunlop Tire & Rubber Co., Buffalo; P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., William O'Neil, president of the General Tire & Rubber Co., and J. J. Newman, vice president of The B. F. Goodrich Co., all of Akron. O. Frank D. Hendrickson, president of the American Hard Rubber Co., New York, was reelected to fill a term expiring in 1948. The board consists of 15 members, elected for three-year terms in groups of five.

A. L. Viles, president, and the other officers of the Association were reelected at the annual meeting at the Waldorf-Astoria on January 7.

Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J., has appointed Glenn S. Watson chief chemist of the Marietta, O., works. Dr. Watson, a native of Masontown, W. Va., obtained his B.S. degree at West Virginia University in 1930, his M.S. in 1931, and a Ph.D. in chemistry in 1936. He joined Calco that same year and was for some time connected with the research laboratories and prior to his present appointment held the post of an assistant divisional chief chemist at the Bound Brook plant.

Fraser M. Moffat, Jr., has been made manager of Calco's export department, which will handle all export sales for the company of dyestuffs, intermediates, and pigments. Mr. Moffat was educated at Williams College (Class of 1918) and Massachusetts Institute of Technology (1920). He was associated until 1931 with the National Aniline & Chemical Co. as production manager and later as director of manufacturing. Then until 1936 he served as president and a director of Earl, Moffat & Co., Inc. Since 1934 he was also a vice president of U. S. Industrial Chemicals, Inc., in charge of development of new products. Mr. Moffat served in both World Wars, most recently as a colonel in the Chemical Warfare Service.

The Rubber Reclaimers Association Inc., held its annual meeting at the Biltmore Hotel, New York, N. Y., at which the following officers were reelected: president, William Welch, of Midwest Rubber Reclaiming Co., East St. Louis, Ill.; vice president, F. E. Traflet, Pequanoc Rubber Co., Butler, N. J.; and secretary-treasurer, C. T. Jansen, *Rubber Age*, New York. The Association's executive committee will once again be headed by Jean H. Nesbit, U. S. Rubber Reclaiming Co., with R. E. Casey, Naugatuck Chemical Division of United States Rubber Co., and C. R. Shaffer, Xylos Rubber Co., Akron, O., comprising the remainder of the committee.

Hewitt Rubber, division of Hewitt-Robins, Inc., Buffalo, N. Y., has named Robert D. Bernhard to supervise sales of industrial hose and belting in the Indianapolis territory, which includes all of southern Indiana and Louisville, Ky. This is an expansion of Hewitt service in the field, and the territory formerly was served from the St. Louis office by A. S. Purmort, who now will concentrate on the Missouri and southern Illinois territory. Mr. Bernhard joined the company in April, 1941, and served in the Navy during the war. Since returning to Hewitt several months ago, he has been in the sales office at Buffalo headquarters.

Commodity Exchange, Inc., 81 Broad St., New York, N. Y., on January 23 held its annual election at which six members of the board of governors were reelected and two new members named, one of whom is Albert A. Garthwaite, president, Lee Rubber & Tire Corp., Conshohocken, Pa. Then the board elected as president of the Exchange, Edward L. McKendrew, vice president, Armand Schmoll, Inc., hide dealer; he succeeds Philip B. Weld, partner of Harris, Upham & Co., who served in the presidency during the last four years. Floyd Y. Keeler, partner of Orvis Bros. & Co., was reelected treasurer, and four vice presidents were elected to head groups within the membership.

United States Department of Commerce, Office of International Trade, Washington, D. C., on January 8 reported the removal of export controls over truck and bus tires and all types of tubes; but passenger-car tires remain subject to export limitations. A record production of bus and truck tires during 1946 made possible removal of the restrictions, OIT explained. According to figures from the Office of Temporary Controls, production of truck and bus tires during 1946 was estimated at 15,900,000 units, compared with 8,221,000 in the record prewar of 1940. Passenger-car tires will be freed from export control as soon as the supply is sufficient to insure that shipments abroad will not cause an undue drain on the domestic market, OIT promised.

"Current Export Bulletin, No. 392," January 22, 1946, states that in view of the general relaxation of export controls on truck tires, trucks, truck tractors, and buses, which have been placed on general license to group K countries, the special provisions governing the exportation of pneumatic tires on used vehicles, contained in Comprehensive Export Schedule No. 22, page 65, section II, part 8, item 20, are no longer applicable and are therefore discontinued.

Thermoid Co., Trenton, N. J., has appointed Norris Green, recently district manager for the company at Birmingham, Ala., acting field manager of the oil field products division, to replace Paul Kelting, who died in December. Mr. Green will have headquarters at Thermoid's Houston, Tex., office at 1121 Rothwell St. The new field manager has served many years in the sale of Thermoid rubber products. Before joining Thermoid he had acquired experience through affiliation with other companies in the industry and enjoys a broad oil field experience. He was also a lieutenant colonel in the Army during World War II.

T. E. Allen, recently resigned as executive vice president and general manager of the Brake Lining Manufacturers Association, New York, to become assistant to President Fred E. Schluter on public and industry relations and also to assist the vice president of automotive sales and service. Mr. Allen also will supervise advertising policy and represent The Thermoid Co. in industry association meetings. Prior to his association with the B.L.M.A., Mr. Allen for 16 years served as an executive of the American Automobile Association at its Washington headquarters. The new Thermoid executive was born in Salt Lake City, Utah, and is an alumnus of George Washington University. Besides he is chairman of the committee on brake standards of the Society of Automotive Engineers and has been active in the American Society for Testing Materials and the American Standards Association.

General Electric Co., Schenectady, N. Y., has made Frank W. Warner, Jr., for the past three years engineering manager of the plastics division, engineering policy manager of the company's chemical department at Pittsfield, Mass. He will be responsible for the coordination of all engineering and laboratory activity of the department and will make his headquarters at Pittsfield. He has been with General Electric since July, 1929. He is a graduate of Pennsylvania State College.

Rolf G. Grote

Rolf G. Grote, formerly associated with the Wilmington Chemical Corp., has organized an export-import agency with headquarters at 1482 York Ave., New York, N. Y. Mr. Grote will specialize in rubber, plastics, wire and cable, and similar products and has already established contacts in a score of foreign countries, arranging for representation in the United States for foreign concerns and outlets abroad for American companies. Mr. Grote is the son of Walter H. Grote, head of export of the Philblack Division of the Phillips Petroleum Co. and well known in the rubber industry.

Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa., has appointed Laurens H. Fritz industrial advertising manager to succeed John C. Fairchild, resigned. Mr. Fritz, formerly with Aitkin-Kynett Co., Philadelphia, will take charge of advertising, sales promotion, and marketing research for industrial products and Sun's wholesale and furnace oil departments.

Foster D. Snell, Inc., firm of consulting chemists and engineers, has moved from 305 Washington St., Brooklyn, to 20 W. 15th St., New York, N. Y.

Thomas D. Cabot, vice president, general manager, and treasurer of Godfrey L. Cabot, Inc., Boston, Mass., was elected a board member of the National Industrial Conference Board at its recent meeting in New York, N. Y.

Victor A. Indig, export manager of the American Rubber Mfg. Co., 1145 Park Ave., Oakland 8, Calif., was elected vice president of the Export Managers' Association of San Francisco at its annual meeting on January 10.

Pacific Rubber & Tire Mfg. Co., 4901 E. 12th St., Oakland 1, Calif., plans for construction of a reinforced concrete warehouse with shipping facilities. The two-story structure, to be 120 by 250 feet, will cost approximately $165,000.

OHIO

Cuban Plant Starts Operations

Production of passenger-car tires embodying the same construction and design as the first American postwar tire —the one that The B. F. Goodrich Co., Akron, introduced in the United States within six weeks after V-J Day—has started at Compania Goodrich Cubana, S.A., Havana. Curing molds for the new, wider tread design largely credited with enabling this tire to "outwear prewar tires" have become available in Havana. This means that the parent company has virtually completed its intensive program of changing over molds in its American plants, it was explained.

Other Goodrich Activities

A new district office of Goodrich's industrial products sales division has been established in Cincinnati, with John S. Gulledge district manager. The move was necessitated by the increasing importance of Cincinnati and surrounding territory in the sale of industrial rubber products and the desire better to serve the company's customers in that area. Mr. Gulledge has been in industrial product sales since he joined the company in 1923. He served as manager of the St. Louis district from 1939 until called to service in the Army Air Forces at the beginning of the war, during which he became a colonel. Since rejoining the company he served as acting manager of the Denver district and on special assignments for the industrial products sales division.

Clyde A. Voris, a member of the Akron training personnel department, with Goodrich since 1941, has been named personnel manager of the company's industrial products plant in Cadillac, Mich. Mr. Voris is a graduate of Ohio University, where he majored in industrial management. He has completed his work for a master's degree in personnel management at Akron University, to be conferred early in 1947. His first company assignment was manager of apprentice training.

R. W. Nickels has been appointed manager of drug sundries sales, it was announced by E. F. Tomlinson, general manager of Goodrich's industrial products sales division. Mr. Nickels joined the company in 1927 and served in the sales, credit, and operating departments in the Cincinnati, Philadelphia, Pittsburgh, Cleveland, and Detroit districts before becoming national manager of budget sales with headquarters in Akron. In his new post, Mr. Nickels succeeds Clyde DeLong, recently named merchandise manager of the industrial products sales division.

Membership of the Twenty-Year Service Club of the Goodrich Co. was boosted to more than 5,000 at the recent semi-annual pin presentation in Akron. Ten employes who had served 40 years, 81 with the company 30 years, and 297 in the organization 20 years were presented their service emblems by Goodrich President John L. Collyer. All had completed these periods of service since last June.

Not the least of the war's casualties among rubber products were tires for tricycles. Goodrich production of semi-pneumatic balloon-type shoes for tricycles is once again nearing peacetime levels, and facilities are being expanded.

The General Tire & Rubber Co., Akron, has promoted A. Ray Carr to the position of sales promotion manager, according to L. A. McQueen, vice president in charge of sales. Mr. Carr, a part-time instructor at Akron University, has taught business administration, salesmanship, and advertising at his Alma Mater during the last seven semesters. Formerly assistant advertising manager with People's Drugs in Washington, D. C., and with the retail advertising department of the Goodyear Tire & Rubber Co., Mr. Carr joined advertising manager R. H. Harrington's staff at General two years ago in charge of creative production, which included the editorship of the company's dealer magazine, *The General Tire News*.

Mr. Carr majored in advertising and marketing to earn his B. S. degree at Akron U. in 1936, and he took graduate work in advertising at George Washington University, Washington, D. C. He is a member of the Theta Chi Fraternity. A native of Beaver Falls, Pa., he is also director of the Akron Advertising Club, and a member of the Knights of Columbus of Cuyahoga Falls. He is married and the father of Mary Anne, Robert, and Raymond Michael.

Philblack Appointments

Recent appointments in the Philblack Division of Phillips Petroleum Co., Akron, were announced last month by Frank Andrews, sales manager. George Wyrough will be technical representative for New Jersey, southeastern New York (including New York City), eastern Pennsylvania, Maryland, and Virginia, with headquarters in Trenton, N. J. John A. MacKay will be technical representative for New England and eastern New York, with headquarters in Boston, Mass.

Mr. Wyrough is the retiring chairman of the New York Rubber Group and is also a member of the heavy mechanical goods technical committee of The Rubber Manufacturer's Association, Inc. For the past five years he was factory manager for Whitehead Bros. Rubber Co., Trenton, manufacturing subsidiary of Goodall Rubber Co., and also served as chief chemist for the same company. Prior to Whitehead, he had been associated with the Thermoid Co., the development department of Republic Rubber Co., Youngstown, O., and as chief chemist for the Murray Rubber Co., Trenton. Mr. Wyrough was graduated in chemical engineering from Pennsylvania State College in 1920.

Mr. MacKay has had broad experience in the mechanical molded goods field, including extruded and sponge rubber products. In 1941 he became technical superintendent of Sun Rubber Co., Barberton, O., having charge of product design, process and engineering development, and rubber compounding. He first served with Sun as assistant chief chemist and later as chief chemist. Mr. MacKay had also been with McColl-Frontenac Oil Co., Montreal; S. C. Williams Rubber Co., Woodbridge; and Dominion Rubber Co., Ltd., all in Canada. He is a graduate of Acadia University, Novia Scotia, where he received his degree in science and engineering.

Philblack also has appointed H. L. Blanchford, Ltd., its Canadian representative. This firm, founded in 1921 by H. Lloyd Blanchford, has serviced the Canadian rubber industry with carbon blacks and other rubber pigments and chemicals. A Toronto office was established some years ago, and agents are located in Winnipeg, Man., and Vancouver, B. C.

Harry A. Hencher is sales manager for the Quebec and eastern territory, and J. Paul Hooper is manager of the Toronto office. Mr. Hencher, a director of H. L. Blanchford, Ltd., is a graduate in chemical engineering from the University of Alberta and has been with the company in a sales and service capacity for the past five years. Mr. Hooper, also a director, is a graduate in chemical engineering from the University of Toronto and for eight years has served the rubber trade in the Province of Ontario.

Head office, laboratories, and manufacturing plant for the Blanchford concern are at 977 Aqueduct St., Montreal, P. Q., where it owns a large building centrally located and with ample space for future expansion. Warehouse stocks are stored both in Montreal and Toronto so that prompt deliveries can be made of Philblack A and other products vital to the rubber industry.

George Wyrough

Syx Studio, Akron

John A. MacKay

W. Miller Cook Associates, Inc., a new sales organization, was established recently with headquarters at 1962 Union Commerce Bldg., Cleveland 14. A wide diversity of products made by various rubber manufacturers will be sold on a nation-wide basis, including molded, extruded, lathe-cut, rubber-to-metal, hard and soft rubber, molded sponge rubber parts, and semi-pneumatic tires.

W. Miller Cook, president of the new company, was formerly vice president in charge of general sales of The Ohio Rubber Co., where he had served in various capacities for more than 27 years. He has been active in The Rubber Manufacturers' Association, Inc., for 25 years and has served as chairman of the molded, extruded, lathe-cut, and chemically blown division of that Association for about seven years and as a member of the executive, economics research, personnel and public relations committees, R.M.A. Mr. Cook also belongs to the Cleveland Chamber of Commerce and Cleveland Athletic, Mid-Day, and Westwood Country clubs. He is a 32nd Degree Mason and Shrine Member. Mr. Cook's long and varied experience in the rubber industry is aptly summed in the slogan of his new company—"*Everything in Rubber—Everywhere.*"

Tour of Executives

Directors and executive officers of The Goodyear Tire & Rubber Co., Akron, left Chicago, Ill., on January 9 for an inspection tour of Goodyear factories and activities at Topeka, Kan.; Litchfield Park, Ariz.; and Los Angeles, Calif. In the party were: P. W. Litchfield, chairman of the board; E. J. Thomas, president; R. S. Wilson and P. E. H. Leroy, vice presidents; W. D. Shilts, secretary; H. L. Hyde, general counsel and assistant secretary; A. G. Cameron, John P. McWilliams, Robert G. Payne, George A. Sloan, C. F. Stone, and J. C. Hunsaker, directors. They spent January 10 in Topeka inspecting the company's new passenger car, truck and farm tire manufacturing plant, only factory of its kind in Kansas. Next they went to Goodyear Farms, the 17,000-acre ranch at Litchfield Park, where four days went to a tour of the extensive cotton farming, agricultural research and development activities, and manufacturing facilities for Wingfoot Homes, subsidiary of Goodyear, devoted to the manufacture of prefabricated, low-cost homes.

The regular Goodyear board of directors' meeting took place at Litchfield Park on January 14. Departing on January 15, the directors arrived in Los Angeles the morning of January 16. Two days were spent inspecting the Goodyear-Los Angeles tire factory, first to be established by the tire industry on the West Coast (1919) and the Goodyear-operated government synthetic rubber plant. Departure from Los Angeles was on January 18, and the group arrived back in Chicago on January 20.

Thomas E. Wilson, chairman of the board and chief executive officer of Wilson & Co., Chicago, packing house firm, and B. A. Polsky, president of the A. Polsky Co., were elected to the board of directors at the directors' meeting at Litchfield Park, January 14.

H. J. Ryan has been appointed manager of Goodyear's New York district, succeeding the late G. B. Swarthout.

Assigned to Mr. Ryan's former post, district manager at Newark, is G. J. Ott, who held a similar position at Richmond, which has now been given to W. H. Clark, southeast division truck tire representative.

The following men recently completed three decades with Goodyear: C. W. Stout, farm tire representative, and James W. Reid, field representative, both at Syracuse, N. Y.

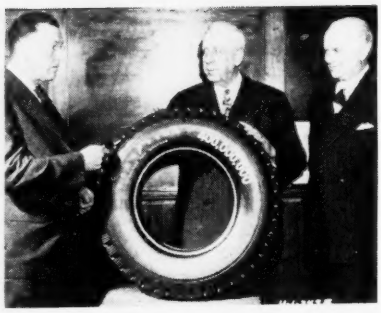
Recent Goodyear Developments

Sponsorship of a $25,000 Goodyear Trophy Race for light planes at the National Air Races in Cleveland during the Labor Day week-end of 1947 was announced last month. Mr. Litchfield, who explained that the purpose of Goodyear sponsorship of this race, to be undertaken for three years, is to encourage the design of light planes. Mr. Litchfield said that all the details of the Goodyear race had not been determined yet, but that plane specifications had been approved by the National Aeronautic Association in Washington and National Air Races management in Cleveland. The specifications, he added, were drawn up by a technical committee of the Professional Race Pilots Association, 2500 W. 73rd St., Los Angeles, Calif., a non-profit organization which will furnish all details of the type of plane eligible to any potential contestant.

Mr. Litchfield said Goodyear Trophy Race committee members, all pilots, included the chairman, Roger Wolfe Kahn, test pilot for Grumman Aircraft Engineering Corp., Jacquelin Cochran, famous aviatrix; Ben Howard, chief test pilot for Douglas Aircraft Co.; Arthur C. Chester, vice president of the P.R.P.A.; Clarence Bell, manager of Goodyear's landing gear department; and Harry A. Bruno, public relations counselor for Goodyear.

Purchasing of production planning data from Goodyear and its subsidiary, Goodyear Aircraft Corp., by the Army and Navy is among the government's latest air industrial preparedness planning projects. According to an announcement from the Air Material Command Headquarters at Wright Field, Dayton, Goodyear is supplying information of production possibilities on airplane wheels and brakes, and the aircraft subsidiary is giving the Navy Bureau of Aeronautics data on their production problems and possibilities on prototype airplanes. The companies are among 22 of the nation's leading aircraft and aeronautical equipment manufacturers given assignments along these lines.

Goodyear Aircraft has been awarded an N.C. license for its GA-2 three-place amphibian plane, informally dubbed the "Duck." Final inspection was made, and the license awarded by K. M. Warder, civil aeronautics inspector of the manufacturers' inspection division in Alliance, O. The GA-2 had been flown experimentally with an N.X. license since March 8, 1946. Of modern metallic construction with laminated plastic wing floats and pusher-type engine, the plane has a cruising speed of 110 m.p.h., top speed of 125 m.p.h., takes off from water with a 1,300-foot run, and lands at approximately 50 m.p.h. on either land or water. Goodyear equipment in the plane includes tires, single disk brake, Pliocel fuel tanks, Airfoam seat cushioning, electric direct-drive starter, a tail wheel shock absorber which uses rubber, a wheel



R. P. Dinsmore, Vice President in Charge of Research, Presents Goodyear's 400,000,000th Pneumatic Tire to P. W. Litchfield *(Center)*, Board Chairman, and Company President E. J. Thomas, *(Right)*

control mounted from the instrument panel, a retractable water rudder, and a two-way radio. The company has announced no production plans for the plane, but will continue its program of experimentation and development.

Two important wartime contributions to military aviation made by the Goodyear research laboratory are expected to prove equally valuable to commercial aviation in the years ahead. They are the light-weight flexible fuel cell and the propeller ice guard. Goodyear scientists pioneered in the development of the fuel and oil tanks or cells, Dr. Sebrell pointed out. The flexible tanks, known by the company's trade name of Pliocel, are now being turned out for commercial aviation and do not, of course, possess the bullet-sealing properties of the wartime tank. Dr. Sebrell revealed that the Goodyear tank is made of nylon. A process developed during the war and kept secret until recently consisted of making the tanks of nylon fabric, which was then sprayed with a solution of nylon to increase resistance to the passage of highly volatile fuels. Whereas metal tanks weigh half a pound per square foot of surface, and the bladder types weigh almost as much, the Pliocel weighs only 0.08-pound per square foot. A 100-gallon Pliocel can be folded without damage to the size of a woman's handbag. Now being made in sizes ranging from five to 500 gallons, Pliocels can be made in a great variety of shapes. Most of them fit into plane wings, but some are built to go into the fuselages. One special tank has been built to hang on the underside of a helicopter. The tanks can also be used as gasoline and oil containers for boats, trucks, transport trailers, and automobiles.

The Goodyear ice guard, developed as a means of preventing the formation of ice on propeller blades, consists of a long, narrow rubber "sandwich" bonded to the edges of the propeller blades. The inner sheet of the "sandwich" is of electrically conductive rubber which is heated by passage of an electric current and prevents ice formation. The outer sheets are of a special type of non-conductive, abrasion-resistant rubber which is said greatly to increase the life of the device and add to its efficiency.

With production of its 400,000,000th pneumatic tire, Goodyear disclosed its newest advance in the field of rubber accelerators. Given the code name of Butrax, the material replaced previous accelerators in the milestone tire. It tends further to equalize the effect of temperature variations both inside and outside the casing in the tire curing process. This in turn serves further to reduce the possibility of tread cracking and ply separation. Butrax is stated to be a substantial improvement over preceding accelerators and to be especially beneficial in the processing of synthetic rubber tires. Its use will continue as greater percentages of natural rubber become available for blending with synthetic rubber. Mr. Litchfield has added Tire No. 400,000,000 to the collection of "milestone tires" which go back to the earliest days of the pneumatic auto tire. A company statistician has figured out that Goodyear's total tire production would fill 350,000 modern freight cars and make a train some 2,500 miles long; also that it totals approximately 5,500,000,000 pounds of rubber consumed in the process.

A new and improved general-purpose rubber reinforcing agent for extruded and molded products and calender coated fabrics has been announced by Goodyear. Known as Pliolite S-6, the material is a synthetic resin produced from readily available raw materials, according to L. B. Sebrell, director of research and chemical products development. Available through the plastics and coating department of Goodyear's chemical products division, Pliolite S-6 is said to have particular value in the manufacture of rubber insulated wire. According to Herman R. Thies, department manager, use of Pliolite S-6 as a reinforcer makes possible a wide variety of colors in rubber products and in addition improves stiffness, hardness, and abrasion resistance. When used at elevated temperatures, the resin improves the processability of stocks and prevents their shrinkage upon cooling. This latter feature is of particular value in producing wire insulation where it is difficult to apply a thin insulation which is uniform in thickness. Use of Pliolite S-6 is also said to improve the ease of extrusion and make possible the production of thin rubber tubing of uniform wall thickness.

Dr. L. W. Darrah, assistant superintendent of the Massachusetts State Hospital at Northampton, has developed a new method of preparing specimens for classroom study and examination. The method uses Goodyear's Pliofilm and enables the study of specimens without the formaldehyde solution normally required. Preparation is relatively simple, and specimens may be kept in their Pliofilm wrap for two years without deterioration. In preparing a classroom specimen, the sample is removed from its formaldehyde solution, dried, and wrapped with a sheet of Pliofilm, which is then heat sealed.

Natural rubber is returning to industrial rubber products, after an absence of five years, to find many of its former applications now taken over, perhaps permanently, by synthetic, according to Goodyear. Despite steadily increasing availability of tree rubber for such products as hose, gaskets, vibration dampeners, power-transmission belts, conveyer belts, and others, W. C. Winings, manager of Goodyear's mechanical goods division, said natural rubber is being worked into the standard product line only where "its suitability in the matter of improving quality is clearly established." Mr. Winings indicated that the first new supplies of natural rubber will find their way into such items as conveyer belts in certain applications, or in some types of sand-blast hose. Here the softness of

natural rubber alleviates the abrasive or cutting effects of sharp objects coming into contact with it. Synthetic rubber, however, will continue to be blended with natural to preserve such qualities as resistance to oil, acid, sunlight, and aging. Tank lining was cited as a specific case where natural rubber will have a hard time regaining its former importance. Natural rubber for this purpose required intricate formulation and presented many difficulties in working to acquire the proper rigidity when it was in place inside the tanks. By comparison, far better results are being obtained today for this application with synthetic.

U. S. Army paratroops and ski troops may have taken the highly specialized boots they wore pretty much for granted, but have a quiet, thoughtful, 67-year-old, T. F. Crimmin, of Windsor, Vt., to thank for assisting in the development of their efficient footgear. Mr. Crimmin, who is shoe technician for Goodyear's shoe product subsidiary, the Windsor Mfg. Corp., played an important part in development of these boots. When it was decided to construct paratroop and ski boots with leather midsole and rubber soles and heels, Army representatives visited the Windsor plant and consulted with executives of the company who immediately called in Mr. Crimmin and gave him the task of assisting in the design of the best possible soles and heels for the boots and methods of constructing them. Doing the initial work by hand, Mr. Crimmin devised means of improving production methods so well that ultimately the Windsor plant was awarded the contract to manufacture all of the rubber heels and soles used on these boots by the Army.

Having been given assurance of priority in needed materials still under government control, for construction of prefabricated homes, the Goodyear subsidiary, Wingfoot Homes, Inc., this year plans production of 600 or more homes monthly. The pilot-plant at Litchfield Park, Ariz., according to J. C. Thomas, Wingfoot vice president, is turning out between 75 and 100 homes each month, and production will be stepped up considerably. The company has also leased the former Walworth Navy valve plant at Washington Park, Ill., which by early Spring should be turning out about 150 homes a week.

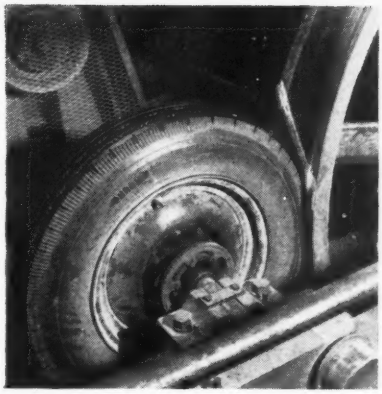
Rubber and Plastics Modernize Akron's Mayflower Hotel

The Mayflower Hotel, Akron, is combining safety with beauty in its current renovation with new fire-resistant materials and furnishings to reduce the danger of lobby and room fires. Through extensive use of upholstery fabric made from Firestone Tire & Rubber Co.'s Velon plastic filament, and of specially treated draperies and wallpaper, G. Thomas Cullen, hotel manager, believes he has virtually eliminated the danger of cigarette fires and has minimized the hazard of rapidly spreading fires through furniture and draperies. Stressing beauty and durability in his selection of fire-resistant materials, S. A. Davis, the interior designer, featured colorful Velon plastic woven fabrics for lobby and guest-room chairs and divans. These fabrics are non-absorbent, therefore non-staining, and their colors will not run or fade, it is said. Draperies and wall coverings are recently developed materials that will not stain or absorb dirt and can be cleaned with soap and water. They, too, are specially treated to minimize flammability. Leather-like plastic is used to upholster some of the hotel's office furniture; while plastic film, in a variety of colors and designs, is used for shower curtains.

For cushioning, Goodyear Tire & Rubber Co.'s Airfoam foamed rubber latex is used in chairs and divans. It is sanitary and generally regarded as the most comfortable type of cushioning yet developed. An Airfoam carpet padding, 3/8-inch thick, has been placed under the rug in the hotel lobby. In addition to providing noticeable underfoot comfort, the padding also prevents the rug from creeping on the composition marble lobby floor. Foamed rubber latex mattress cushioning is also being used extensively for guest rooms.

Present plans call for extending the modernization program throughout the entire hotel, featuring added applications of rubber and plastics. According to Mr. Cullen, the safety features alone justify use of the fire-resistant materials; while the savings to be realized in reduction of maintenance and repair cost justify extensive redecoration of hotel rooms from a long-term financial basis.

View of Mayflower Hotel Lobby, Showing Velon Upholstery Fabrics and Airfoam Chair Cushioning and Rug Padding



Pharis Glass-Cord Tire Mounted for Endurance Wheel Tests

Pharis Tire & Rubber Co., Newark, in cooperation with Owens-Corning Fiberglas engineers, recently built a few experimental tires using special high-strength glass-cord fabric. The fabric was made and built into two-ply tires that are 40% stronger than four-ply rayon tires. According to Ralph Reel, Pharis vice president in charge of research and development, the important advantages of the glass fabric over other cord materials are its extreme high strength and resistance to heat. If certain problems in connection with coating and adhesion can be worked out, Mr. Reel said, the glass tire will make a very much stronger tire, far more resistant to damage from such common obstacles as stones, curbs, and other road hinderances. Mr. Reel admitted, however, that it is not economical to build these tires now since the cost of the glass fabric at $2.50 per pound is three times as much as the 80¢ price for cotton or rayon. The 6.00-16 glass tires built weighed three pounds less than regular Pharis first-line tires in spite of their increased strength. While the endurance wheel tests on tires containing glass fabric were by no means so good as those with cotton or rayon, company engineers are continuing their experiments toward perfecting glass tires because of greater strength and heat resistance.

The Oak Rubber Co., Ravenna, which anticipates a great interest in toy balloons this year, has had, for some time, to book orders on a basis of "shipment as soon as possible," and production departments have been working 24 hours a day to "catch up."

Cleveland National Rubber Corp., 2001 Center St., Cleveland 13, has elected Earl R. Hendricks, president; Louis J. Zsoka, vice-president; John Rigo, Jr., Assistant vice president; Frank C. Hendricks, treasurer; and Thomas V. Hagaman, secretary. It was announced at a recent meeting of the board of directors that producing capacity of friction tape, rubber tape, and rubber cements is being increased immediately. In addition, top personnel, thoroughly experienced in rubber research and experimentation, will be added to the staff to supervise the production of several new rubber items. The company, which was formed a few months ago, will make mechanical, molded, and extruded rubber prod-

ucts as well as special parts and designs to order.

Firestone Tire & Rubber Co., Akron, in its recent annual report to stockholders revealed that last year the Firestone Plantations in Liberia produced more than 48,000,000 pounds of rubber, a new record.

Passenger-car tires should become readily available by April or May, truck tires one or two months earlier, and farm tractor and implement tires in February or March, H. D. Tompkins, vice president in charge of sales for Firestone, reported to farm advisers and agricultural leaders at the recent annual convention of the National Association of County Agricultural Agents in Chicago, Ill. Speaking at a breakfast given by Firestone for more than 300 delegates at the Morrison Hotel, Mr. Tompkins said the rubber industry was turning out more tires than ever before and added that his company had substantially increased production facilities at Akron, Memphis, and Los Angeles, and had opened new tire plants at Des Moines, Iowa, and Pottstown, Pa. The interests of agriculture and industry are identical, Mr. Tompkins added, pointing out that 65% of industry's raw materials now comes from the farm. Industrial research has played an important part in this development.

"We are trying to expand the market for farm products and thus create more opportunities and more profits for the farmer," he declared. "We are trying to lighten his labors by providing tires and other products which enable him to do more work in less time with less effort and at lower cost, and we are glad to support those movements which will help guide future generations of farmers toward a fuller and happier way of life."

NEW ENGLAND

Cabot Conferences

The first of several conferences for the exchange of technical information and discussion of sales policies was recently held in Boston, Mass., by representatives of Godfrey L. Cabot, Inc., and Herron Brothers & Meyer, distributors for the General Atlas Carbon Co., a Cabot subsidiary. The Cabot group, headed by R. G. Allen, executive vice president in charge of manufacturing and sales, included J. Boyd Britton, Mr. Allen's assistant; Owen J. Brown, Jr., general sales manager; Fred H. Amon, technical director; and B. A. Wilkes, of the technical staff. Other members of the Cabot technical sales and service and the research and development departments also participated. William A. Herron, a partner of the Herron company, attended in company with four other representatives: Clarence A. Moore and H. A. Flint, of New York, and George Kline and William Whittaker, of Akron. Cabot recently expanded its sales-service program by appointing Herron Brothers & Meyer sales agent for Cabot products in certain areas of the country. The gatherings were arranged so that the new sales representatives would be better acquainted with Cabot products. The conference lasted three days, with much of the time being spent at Cabot's Boston laboratories. Technical discussions were conducted by Mr. Amon, and there was a seminar on structural elements in synthetic rubber led by W. O. Baker, of the Bell Telephone Laboratories.

D. D. Cochrane, Cabot's chief engineer, recently received a citation from the War Department for his wartime contributions. The Cabot company previously had also been commended. Mr. Cochrane's Certificate of Appreciation was signed by Secretary of War Robert P. Patterson and Maj. Gen. H. C. Ingles, Chief Signal Officer, and commended Mr. Cochrane's work in the development of a satisfactory substitute for Shawinigan carbon black for use in dry cells during World War II. The citation was also accompanied by a letter from Col. J. D. O'Connell, commanding the Signal Corps Engineering Laboratories at Bradley Beach, N. J., expressing the appreciation of the laboratories for Mr. Cochrane's work.

"I am truly grateful for the Certificate of Appreciation," Mr. Cochrane wrote Colonel O'Connell in reply, "but I accept it with considerable embarrassment for the results achieved in that development were due to the good work of a number of patriotic, able men in the Signal Corps, the dry cell industry, and the Cabot company; while my part was simply the coordination of the information and assistance provided by these men."

Cabot has issued 11- by 13¼-inch reprints on plastic-faced paper sheeting of its advertisement which appeared in the January issue of India RUBBER WORLD. The chart is in multicolor and shows the complete line of Cabot carbon blacks with their properties and fields of application.

Farrel-Birmingham Co., Inc., Ansonia, Conn., has appointed Arthur B. Pike, Boston area representative to handle the sale of gears and gear units manufactured at the company's Buffalo, N. Y., plant. He has opened offices at 1736 Massachusetts Ave., Lexington, Mass. Mr. Pike was graduated from the University of New Hampshire in 1934 with a B. S. degree in chemistry. His entire business career has been in the field of sales engineering, and from 1938 until November, 1946, he was partner in the Arthur Pike Co., manufacturers' agent and jobber, which served the territory in and around Boston, Mass.

Connecticut Hard Rubber Co., New Haven, Conn., is manufacturing a Silastic coated conveyer belt for the dehydrator used in processing Birdseye frozen foods. When rapid dehydration was first used to supplement quick freezing as a food preservation method, a primary problem was the rapid removal of moisture without excessive surface hardening. This problem was solved by use of a machine which gives controlled heat applied by conduction, convection, and radiation while the drying foods are agitated mechanically, and by air traveling at a velocity of 1,500 feet per minute. Under the combined action of these three types of heat, about 40% of the moisture content of foods is removed in the first six minutes of processing. Uniformity of processing depends upon free movement of food along a succession of conveyer belts, each about 35 feet long between pulley centers and 46 inches wide. The Silastic coated conveyer belt is odorless, tasteless, and flexible and has a smooth white surface to which food particles do not readily adhere. Furthermore the coating withstands the intense heat to which the foods are first subjected.

Athol Mfg. Co., Athol, Mass., has named Robert M. Tyler sales manager. Mr. Tyler, who joined the organization 11 years ago, had previously been assistant sales manager. A graduate of Dartmouth College, he served in the United States Army for more than four years.

Athol is a pioneer in the coated fabrics field, having started operations in 1915. Among its products is Terson, a long-wearing vinyl resin coated fabric developed and used during the war. It is now being made for upholstering, theater seat coverings, automotive, baby carraige hoods, and many other applications. It is waterproof, scuff-resistant, washable, and can be made fire retardant.

OBITUARY

Harry Hough

HARRY HOUGH, one-time president of The B. F. Goodrich Co., Akron, O., died last month at his home in Scarsdale, N. Y. He was born in New York, N. Y., 64 years ago.

Mr. Hough, who succeeded B. G. Work to the presidency of the Goodrich company on September 27, 1927, was a senior partner in the accounting firm of Lovejoy, Mather & Hough, when he joined Goodrich as a comptroller in 1918. He was with Goodrich a year when he became a director and was made comptroller in charge of finances. In 1925 he was named vice president while still maintaining his position as comptroller. Seven months after Mr. Hough took over the presidency he resigned though he continued as a director of the company.

After returning to New York, he became a partner in the public accounting firm of Stagg, Mather & Hough.

While Mr. Hough resided in Akron, he was active in church and Masonic circles. He was a member of the Portage Country, the University, and the Akron City clubs.

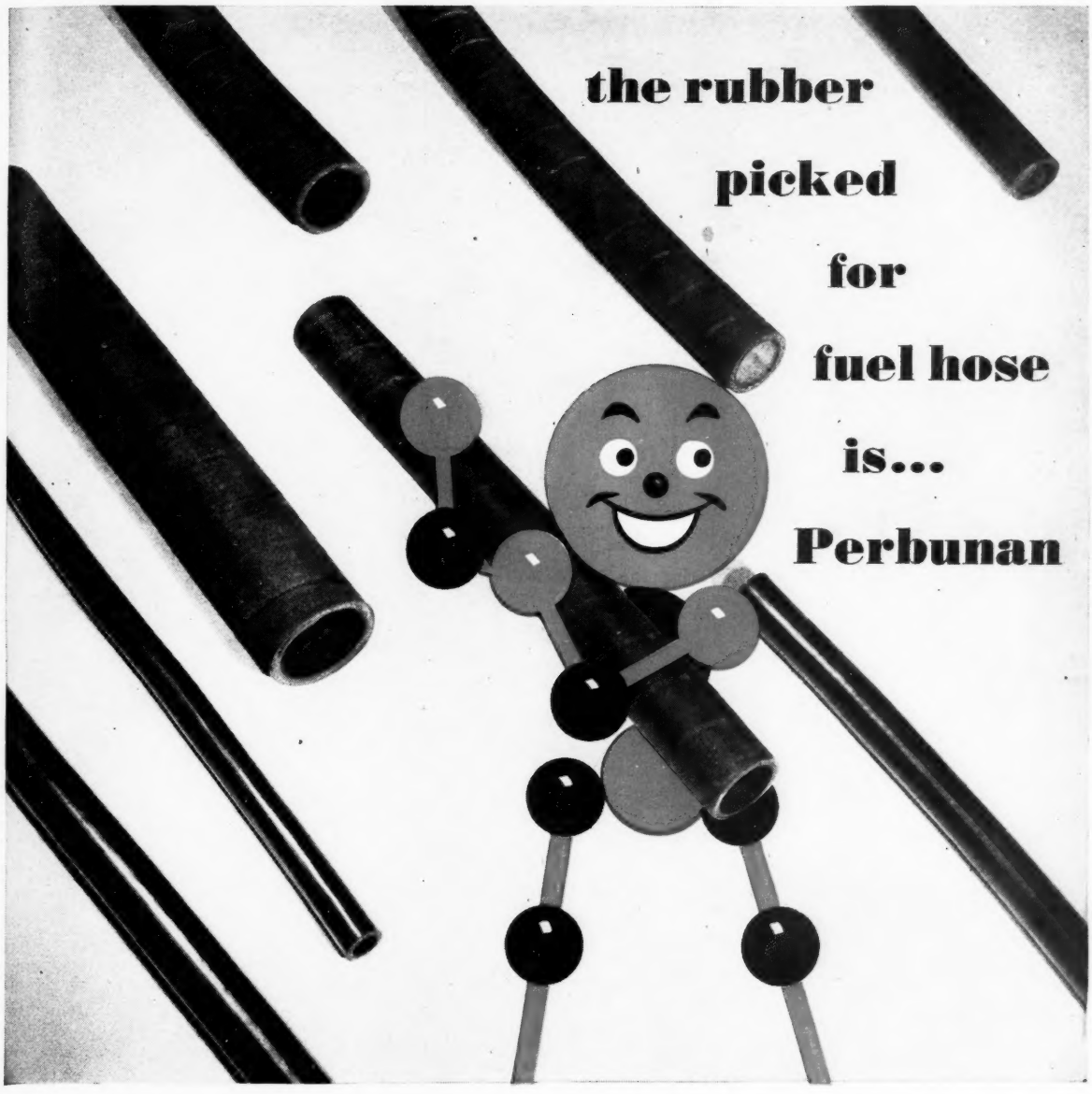
He leaves a wife, a son, and a daughter.

Services and burial were in Scarsdale on January 9.

W. J. Sundstrom

WILLIAM J. SUNDSTROM, manager of the Portland, Ore., district of United States Rubber Co.'s U. S. Tires division, died suddenly at his home in Portland on January 25. He had been with the rubber company since September, 1932, when he was employed in the general offices in New York. He became assistant district manager at Baltimore in 1936 and later was transferred to Richmond. He served as district manager at Milwaukee and St. Louis before going to Portland.

Mr. Sundstrom went there in July, 1941, as district manager of U. S. Tires and



The Metal Hose & Tubing Company of Dover, N. J., picks Perbunan for the rubber backbone of its extensive line of National Synthetic Hose, the "hose for all petroleum products."

Delivering fuel oil and diesel oil...dispensing gasoline from truck and tank...meeting hose specifications of many Army and Navy needs—are but a few instances where Perbunan plays an important helping role in the high performance demanded of National Synthetic Hose.

Our rubber engineers are ready to cooperate on any compounding problems. Write for further information.

For Improved Rubber Parts . . . Compound With PERBUNAN! Resists damage from water, oil, excessive heat, abrasions and petroleum hydrocarbons . . . retains flexibility at sub-zero temperatures!

PERBUNAN
REG. U. S. PAT. OFF.

THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

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proceeded to take an active part in civic activities in Portland. Among the organizations he supported were the American Legion, and Multnomah Athletic, Portland Golf, and Washington Athletic Clubs.

Mr. Sundstrom was born in Iron Mountain, Mich., and was graduated from the University of Washington. He served in the Marine Corps in World War I.

Frank H. Adams

A HEART attack caused the death in Santa Barbara, Calif., of Frank H. Adams, former treasurer of the Goodyear Tire & Rubber Co., Akron, O., on December 26, the eve of his eighty-first birthday. Memorial services were held December 28, followed by cremation. The ashes were returned to Akron.

Mr. Adams, who was born in old Middlebury, O., attended Massachusetts Institute of Technology and then worked as a mining engineer in Mexico. Next he returned to Akron to become cashier of the old First National Bank. He became affiliated with the Goodyear organization in 1909. He retired as treasurer the end of 1917, but continued as a director until 1921.

While in the Rubber City, Mr. Adams became a charter member of the Portage Country and University clubs, was on the Akron Metropolitan Park Board, and was active in Boy Scout work.

He is survived by his second wife, a stepson, five nephews, and three nieces.

Stanley M. Elliott

STANLEY M. ELLIOTT, 34, manager of agricultural tire sales for Seiberling Rubber Co., Akron, O., died January 3 after a throat operation. A graduate of Ohio State University in 1937, Mr. Elliott had been an employe of The B. F. Goodrich Co. from 1939 until early in 1946, beginning as a test engineer and ending as manager of the tire and track testing division. Prior to his employment at Goodrich he had been a research worker for the University of Illinois. The deceased joined Seiberling as assistant manager of agricultural tire sales in March, 1946, and was promoted to the position of manager of the department in August, after the death of J. G. Kreyer, former manager.

Funeral services were held on January 6 at Hopkins Funeral Home, Akron, followed by interment in Ellet Memorial Cemetery.

Surviving are his wife, his mother, a sister, and two brothers.

Maurice E. Lyons

ON JANUARY 4 died Maurice E. Lyons, president and treasurer of The J. H. Day Co., machinery manufacturer, at Cincinnati 22, O. He was born in Allegheny, Pa., 78 years ago.

Mr. Lyons came to Cincinnati in 1888 at the age of 19 to enter the machinery manufacturing business of his uncle, J. H. Day. The deceased began his industrial career as a bookkeeper, subsequently became secretary-treasurer of the concern, and upon the death of Mr. Day was made president and treasurer.

Mr. Lyons, who was a heavy contributor in numerous charities in Cincinnati, was also actively interested in the Boys Club and the Boy Scouts of America. Besides he belonged to the local Rotary Club and was a director of the Central Trust Co. of Cincinnati.

Survivors are the widow and several cousins.

FINANCIAL

Armstrong Rubber Co., West Haven, Conn. Year ended September 30, 1946: net income, $1,141,690, equivalent to $2.79 a share on Class A and B common stock, contrasted with $297,289, or 72¢ a share, in the preceding 12 months; net sales, $17,092,043, against $10,683,258; income tax, $787,140, against $202,536; current assets, $6,544,784, current liabilities, $2,290,931, against $5,418,493 and $1,098,043, respectively, on September 30, 1945.

Firestone Tire & Rubber Co., Akron, O., and subsidiaries. Year ended October 31, 1946: net profit, $27,682,877, equal to $13.21 each on 1,950,834 common shares, compared with $16,446,735, or $7.42 each on 1,951,434 common shares, in the preceding fiscal year; reserve for depreciation, $11,119,063, against $30,242,337; taxes, $71,499,280, against $65,789,178; reserve for contingencies, $5,000,000, against $2,500,000; consolidated net sales, $577,833,422, against $684,744,073; current assets, $200,914,656, current liabilities, $56,937,103, contrasted with $181,600,349, and $42,593,709, respectively, on October 31, 1945; inventories, $98,895,787, against $81,851,590.

Lee Rubber & Tire Corp., Conshohocken, Pa., and subsidiary. Year ended October 31, 1946; net income, $2,153,338, equal to $8.91 a share, compared with $1,206,594, or $5 a share, in the preceding 12 months.

A. G. Spalding & Bros., Inc., New York, N. Y. Year ended October 31, 1946: consolidated net earnings, $1,469,935, equal to $2.82 a common share, against $882,483, or $1.85 a share, in the year ended October 31, 1945; sales, $19,480,017, against $16,258,533.

Rome Cable Corp., Rome, N. Y. Nine months ended December 31, 1946; net profit, $735,048, equal to $3.68 a common share, contrasted with $217,899, or $1.14 a share, in the corresponding period a year earlier.

New Incorporations

Lee-Tex Rubber Products Corp. of Californa, Inc., Los Angeles, Calf. Captal $100,000. Directors: Carl Winstel, J. B. Mullen, and H. W. McConnell, all of 904 W. Blackhawk St., Chicago, Ill.

United Rubber Corp., Los Angeles Co., Calif. Capital $250,000. Directors: Jacob and Sam Kaplan and Paul Faber, all of Los Angeles.

Fixed Government Prices*

	Price per Pound: Civilian Use	Price per Pound: Other Than Civilian Use
Guayule		
Guayule *(carload lots)*	$0.17¼	$0.31
Latex		
Normal *(tank car lots)*	.29¼	.43½
Creamed *(tank car lots)*	.30	.44¼
Centrifuged *(tank car lots)*	.31	.45¼
Heat-Concentrated *(carload drums)*	.32¾	.47
Plantation Grades		
No. 1X Ribbed Smoked Sheets	.25¾	.40
1X Thin Pale Latex Crepe	.25¾	.40
2 Thick Pale Latex Crepe	.25⅛	.39½
1X Brown Crepe	.24⅝	.38⅞
2X Brown Crepe	.24⅜	.38⅜
2 Remilled Blankets (Amber)	.24½	.38¾
3 Remilled Blankets (Amber)	.24⅜	.38⅝
Rolled Brown	.21¼	.35½
Synthetic Rubber		
GR-M (Neoprene GN)	.27½	.45
GR-S (Buna S)	.18½	.36
GR-I (Butyl)	.18½	.33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	.26⅛
(Washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(Washed and dried)	.22½	.40
Caucho Ball (crude)	.11⅝	.24¾
(Washed and dried)	.19½	.37
Mangabiera (crude)	.08½	.19¾
(Washed and dried)	.18	.35½

*For a complete list of all grades of all rubbers see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Athol Mfg. Co.	Com.	$3.00 yr.-end	Dec. 23	Dec. 18
Baldwin Rubber Co.	Com.	0.17½	Jan. 21	Jan. 15
Belden Mfg. Co.	Com.	0.30 q.	Mar. 1	Feb. 17
Brown Rubber Co., Inc.	Com.	0.30	Feb. 28	Feb. 18
Collyer Insulated Wire Co., Inc.	Com.	0.20	Feb. 1	Jan. 23
Crown Cork & Seal Co., Inc.	Com.	0.40 incr.	Feb. 27	Feb. 2
Crown Cork & Seal Co., Inc.	Pfd.	0.50 q.	Mar. 15	Feb. 21
Detroit Gasket & Mfg. Co.	Com.	0.12½ init. q.	Jan. 31	Jan. 20
Dunlop Tire & Rubber Corp.	Com.	1.25	Dec. 20	Dec. 13
Electric Hose & Rubber Co.	Com.	4.00 irreg.	Feb. 21	Feb. 14
Endicott Johnson Corp.	Pfd.	1.00 q.	Jan. 1	Dec. 26
Firestone Tire & Rubber Co.	Com.	1.00	Jan. 20	Jan. 4
General Tire & Rubber Co.	$5 Com.	1.00 extra	Jan. 16	Jan. 6
General Tire & Rubber Co.	$5 Com.	0.25 q.	Feb. 28	Feb. 18
Midwest Rubber Reclaiming Co.	Com.	0.25 q.	Feb. 1	Jan. 16
O'Sullivan Rubber Co., Inc.	Com.	0.10 q.	Jan. 1	Dec. 21
O'Sullivan Rubber Co., Inc.	Pfd.	1.25 q.	Jan. 1	Dec. 21
Thermoid Co.	Pfd.	0.62½ q.	Feb. 1	Jan. 25
United States Rubber Co.	Com.	1.00	Mar. 10	Feb. 17
United States Rubber Co.	8% 1st Pfd.	2.00	Mar. 10	Feb. 17
United States Rubber Co.	8% 1st Pfd.	2.00	June 9	May 19
U. S. Rubber Reclaiming Co.	Pfd.	1.00 accum.	Jan. 15	Dec. 28

To Make Better Tires...Faster

SUN RUBBER-PROCESSING AIDS...

Improve Quality, Speed up Processing of Natural Rubber, GR-S, Neoprene, and Reclaims

With natural rubber becoming more and more available to blend with synthetics and reclaims, the problem of picking the right processing aids for every combination becomes especially important.

Sun now offers the manufacturer a choice of four "Job Proved" processing aids:

CIRCO LIGHT PROCESS OIL— For Neoprene tires and tubes and for rubber components.

CIRCOSOL-2XH— A specially developed elasticator for the GR-S component of tires. A plasticizer and softener for natural rubber.

CIRCOMAR-5AA— A free-flowing softening material of the asphalt-flux type, easy to handle at ordinary room temperatures and recommended for natural rubber, synthetic or blends.

SUNDEX-53— A processing aid in the low-cost bracket. Highly compatible with natural and synthetic rubbers.

The success of these four stems largely from the hydrocarbon structures of which each is comprised. For information on Sun "Job Proved" processing aids and lubricants, call the nearest Sun office or write Department RW2.

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APPLICATION

United States

2,411,437. **In a Method of Molding Articles on a Removable Form by Differential Fluid Pressure, the Use of an Airtight Pressure Membrane of Transparent Flexible Sheet Material.** J. S. Barnes, assignor to Skaneateles Boats, Inc., both of Skaneateles, N. Y.

2,411,509. **In a Seal for a Rotatable Member, a Sealing Member Carried by a Thrust Collar Loosely Mounted on a Relatively Fixed Bearing Member.** P. Endebak, assignor to Tuthill Pump Co., both of Chicago, Ill.

2,411,562. **For Mounting a Vibratory Body on a Supporting Structure, Resilient Means Including a Plurality of Heads, Each Enclosing a Portion of the Supporting Structure and Opposed Segmental Resilient Pads Compressed within Them.** R. S. Thompson, assignor to United Aircraft Corp., East Hartford, Conn.

2,411,630. **Shock Absorber.** E. H. Lehman, Chicago, and G. E. Dath, Mokena, assignors to W. H. Miner, Inc., Chicago, both in Ill.

2,411,638. **For an Electrolytic Processing Tank with a Metal Lining Serving as an Electrode, an Insulating Shield Including Members of Bendable Tubing of Synthetic Resin Resistant to the Chemical Action of the Electrolyte.** S. B. Sanford, Yonkers, N. Y. and W. G. Nutzel, Nutley, N. J., assignors to Otis Elevator Co., New York, N. Y.

2,411,649. **Apparatus for Raising a Sunken Vessel, Including a Series of Inflatable Bags.** E. A. Brizay, Caulfield, Victoria, Australia, assignor of one-third to E. M. Grimm, Hamilton, Queensland, and one-third to A. E. Hughes, Melbourne, Victoria, all in Australia.

2,411,677. **Hot Water Bag Including a Slab-like Rectangular Core of Flexible Insulating Material; the Edges of the Core Are Connected to the Bag's Edges, and Electrical Resistance Coils Are Embedded in the Core.** B. Christenson, Pasadena, Calif.

2,411,743. **In Fluid Pressure Molding Apparatus, a Flexible Fluid-Impervious Membrane Positioned to Cover a Mold and Material to Be Molded.** H. G. Morner, New York.

2,411,825. **Tweezers with a Rubber Head Member.** G. M. Ferguson, Portland, Ore.

2,411,830. **Protective Clothing.** C. P. Krupp, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,411,842. **In a Roller-Type Applicator for Coating Materials, a Covering for the Roller, Including a Pile Fabric Backed with a Cushioning Layer of Sponge Rubber.** R. C. Adams, Cleveland Heights, assignor to Sherwin-Williams Co., Cleveland, both in O.

2,411,868. **Reinforcing Means of Extensible Material in the Hem of a Parachute.** G. B. Brown, Washington, D. C.

2,411,920. **Radial Brake of the Expander Tube Type.** C. Hollerith, Jackson, Mich., assignor to B. F. Goodrich Co., Akron, O.

2,411,922. **Snow and Rain Protector Garment with a Waterproof Pants-Like Body.** K. Koehane, Jackson Heights, N. Y.

2,411,956. **Friction Shock Absorbing Mechanism.** G. E. Dath, Mokena, assignor to W. H. Miner, Inc., Chicago, both in Ill.

2,411,987. **Identification Button of Relatively Resilient Plastic Material.** F. D'Antonio, San Francisco, Calif.

2,412,107. **In an Air-Pressure Liquid Distributing System Including an Air-Pressure Tank and a Motor-Driven Pump, an Elastic Inflated Compressible Pouch within the Tank.** V. L. Tannehill, Fort Wayne, Ind.

2,412,108. **In a Fowl Picking Machine, Including a Drum Having a Shaft on Which Is a Hub Provided with Longitudinally Extending Segments, Sockets Formed in the Segments to Hold Soft Rubber Blocks to Which Are Secured Soft Rubber Fingers.** A. J. Toti and W. E. Snowden, assignors, by direct and mesne assignments, to Modesto Mfg. Co., all of Modesto, Calif.

2,412,122. **Endless Track for Vehicles.** T. D. Campbell, Hardin, Mont.

2,412,169. **In a Vacuumized Can Closure, a Rubber Sealing Plug for an Opening.** J. H. O'Neil, assignor to Continental Can Co., Inc., both of Syracuse, N. Y.

2,412,255. **Tweezers with a Cylindrical Rubber Insert.** G. M. Ferguson, Portland, Oreg.

2,412,274. **In Apparatus for Molding Laminated Panels, a Removable Elastic Blanket Adapted to Be Folded around and Cover the Assembled Sheets on a Die.** G. E. Kloote, assignor to Haskelite Mfg. Corp., both of Grand Rapids, Mich.

2,412,319. **Windshield Wiper.** L. J. Carey, assignor to Marquette Metal Products Co., both of Cleveland, O.

2,412,397. **Flexible Tube Pump.** L. E. Harper, Kansas City, Mo.

2,412,406. **Aircraft Landing Wheel.** J. Kerezi Detroit, and L. C. Maysilles, Wayne, both in Mich.

2,412,466. **In Solar Distillation Apparatus, an Inflatable Envelope Adapted to Float on the Surface of Liquid to Be Distilled.** W.H. Miller, Jr., South Orange, N. J., assignor to Gallowhur Chemical Corp., a corporation of Vt.

2,412,487. **Thermoplastic Pipe Flange.** O. B. Amley, Bay City, and J. B. Gregory, assignors to Dow Chemical Co, both of Midland, both in Mich.

2,412,528. **Metal Container with Interior Coated with a Relatively Flexible Prime Coating Including a Polymerized Hydrocarbon and a Relatively Rigid Top Coating Including a Thermoplastic Synthetic Resin.** J. C. Morrell, Oak Park, Ill.

2,412,556. **In a Distribution System Including a Pair of Adjacent Pipe Line Sections Connected by a Manifold, an Insulated Cable Conductor in Each Pipe Line Section Extending into the Manifold.** G. E. Bennett, Ridgewood, assignor to Okonite-Callender Cable Co., Inc., Paterson, both in N. J.

2,412,565. **In an Egg-Cleaning Machine, Combined Cushioning and Cleaning Elements of Sponge Rubber.** R. S. Davis, Otsego, Mich.

2,412,685. **In a Conduit Coupling, a Plug Unit Readily Attachable to and Detachable from a Socket Unit; One of These Units Has a Tubular Casing and a Tubular Elastic Sealing Element.** J. A. Hoffman, Roselle, S. R. Oldham, West Orange, and W. J. Jacobson, Plainfield, all in N. J., assignors to Linde Air Products Co., New York, N. Y.

2,412,793. **In a Collapsible and Expansible Pontoon for Airplanes, Including a Casing with Closed Top and Open Bottom, a Skimmer Plate below the Casing and a Follower Plate within the Casing, a Flexible Air-Impervious Member Interconnecting Skimmer and Follower Plates to Provide an Air Chamber.** E. Weissman, Baltimore, Md.

2,412,794. **In a Vacuum-Seal Package Including a Receptacle with Annular Mouth Rim, a Closure Provided with a Gasket of Plastic Sealing Material.** W. P. White, assignor to White Cap Co., both of Chicago, Ill.

2,412,904. **In a Refrigerator Having a Compartment Divided into Upper and Lower Sections by a Horizontal Perforate Shelf, a Resilient Sealing Strip Disposed along Its Forward Edge.** R. H. Money, Mount Healthy, and J. W. Craig, assignors to Crosley Corp., both of Cincinnati, both in O.

Dominion of Canada

437,900. **In a Pump Including a Cylinder and a Double Acting Piston, Resilient Valve Means Arranged in the Piston.** Dowty Equipment (Canada) Ltd., assignee of T. R. Wingate, both of Montreal, P. Q.

437,904. **In a Resistor Unit of the Type Having an Insulation Body Provided with a Thin Layer of Conductive Material and a Coating of Polystyrol in Direct Contact with the Conductive Layer, the Improvement of a Protective Cover of a Polyvinyl Plastic Firmly Adherent to the Coating.** Electric and Musical Industries, Ltd., Hayes, assignee of A. G. Clarke, Hillingdon, Middlesex, England.

437,918. **In a Resilient Mounting Including a Receiving Member Having a Socket, an Element of Rubber Seated therein.** Lord Mfg. Co., assignee of T. L. Yates, Erie, Pa., U.S.A.

437,919. **Power Wringer.** Lovell Mfg. Co., assignee of W. L. Kauffman, II, both of Erie, Pa., U. S. A.

437,969. **Endless Belt for a Vehicle Track, Including a Series of Longitudinal Strands Enclosed in a Fabric Envelope and a Rubber Body Enclosing the Envelope.** J. A. Bombadier, Valcourt, P. Q.

437,987. **In a Bladder Construction for Holding Liquids, the Combination of a Hollow Body Having a Flexible Thermoplastic Resinous Side Wall and a Filling Tube of Flexible Material.** A. N. Spanel, Princeton, N. J., U. S. A.

437,988. **Patch for Rubber Articles, Including an Adhesively Coated Elastic Sheet and an Air- and Light-Proof Inelastic Cover Sheet Adapted for Temporarily Adhesively Attaching to the Elastic Sheet.** D. T. Starr, San Gabriel, Calif., U. S. A.

438,002. **In a Magnetic Recording Device, an Erasing Head to Clean a Recording Medium.** Armour Research Foundation, assignee of M. Camras, both of Chicago, Ill., U. S. A.

438,008. **Moistureproof Laminated Sheet Including a Sheet of Metal Foil, a Protective Covering of Paper, and an Outer Covering of Thin Flexible Heat-Sealable Water, Moisture- and Vapor-Proof Material Laminated to the Outer Faces of the Protective Coverings.** Canada Foils, Ltd., assignee of C. P. Olstad, both of Toronto, Ont.

438,027. **In the Manufacture of Electric Motors, Insulation of the Armature Slots with Polytetrafluoroethylene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. M. Joyce, Jr., Marshallton, Del., U.S.A.

438,087. **In Apparatus for Contacting a Gas with a Liquid Containing Suspended Solids, an Absorption Tower Containing as a Packing a Plurality of Hollow Rubber Balls.** Imperial Chemical Industries, Ltd., London, England, assignee of L. W. W. Clarke, Transvaal, South Africa, and B. J. Byrne, Mold, Flintshire, Wales.

438,094. **In the Manufacture of a Rigid Electrical Coil or Like Assembly, the Use of Preformed Members of Fibrous Material Impregnated with a Polymerized Resin.** International Standard Electric Corp., New York, N. Y., U. S. A., assignee of J. K. Webb, London, England.

438,155. **In Laminated Material, a Woven Core of Textile Threads and Steel Wires; the Core Is Impregnated with Synthetic Resin, and a Wood Veneer Secured to Each Face of the Core by a Synthetic Resin Adhesive.** W. Y. Jones, Kingston Hill, Surrey, England.

438,218. **Resilient Cushioning Elements in a Carboy Construction.** Dominion Rubber Co, Ltd., Montreal, P. Q., assignee of J. W. Nygren, Naugatuck, Conn., U.S.A.

438,236. **Elastic Sections in a Body Molding Garment.** La Resista Corset Co., assignee of H. L. J. Smith, Bridgeport, Conn., U. S. A.

438,244. **For Sealing a Refrigerator Door, a Retractable Gasket Means.** Philco Corp., Philadelphia, assignee of G. E Curtiss, Jr., Penn Wayne, both in Pa., U. S. A.

438,289. **Electrical Heating Element Including Resilient, Gastight Tubular Means.** H. H. Schwarzkopf, Reutte, Tyrol, Austria.

438,293. **Wrist Supporter Made from a Strip of Flexible, Elastic Textile Material.** J. C. Capossela, North Tarrytown, N. Y., U. S. A.

438,296. **Outsole Made of Wound Fibrous Material Having Incorporated therewith an Element of Molded Material.** J. Gregg New Hope, Pa., U. S. A.

438,298. **In a Laminated Article, Fibrous Skin Laminae Bonded together by a Thermosetting Resin, and Fibrous Core Laminae Bonded together by a Thermoplastic Adhesive.** B. Jablonsky, Croyden, Surrey, England.

438,337. **In a Method of Fabricating a Mold, Which Includes Coating a Fusible Pattern with a Refractory Composition, the Use of an Organo-Silicon Halide to Render the Refractory Coating Water-Repellent.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of R. H. Thielmann, Schenectady, N. Y., U. S. A.

United Kingdom

581,924. **Rubber Shod Rims and Wheels.** Andre Rubber Co., Ltd., and T. Gillett.

582,020. **Anti-Vibration Mountings for Electrical Apparatus Such as Electron Discharge Tubes.** Standard Telephones & Cables, Ltd., and M. L. Gaylord.

582,074. **Heels for Boots and Shoes.** F. Ward.

582,253. **Temporarily Protective Surfaces for Plastic and Other Structures.** Ford Motor Co., Ltd.

582,278. **Flexible Hose.** Dunlop Rubber Co., Ltd., and W. Holland-Bowyer.

582,390. **Protective Outer Garments.** G. E. Monty.

582,425. **Resilient Mountings.** B. F. Goodrich Co.

582,463. **Universal Joints or Couplings and Rubber Bushes.** Metalastik, Ltd., and R. Boole.

582,469. **Resilient Mountings.** Andre Rubber Co., Ltd., and J. M. Buchan.

582,499. **Storage Batteries or Like Containers.** India-Rubber, Gutta-Percha & Telegraph Works, Co., Ltd., and H. L. Harding.

582,525. **Securing Device Utilizing the Resilient Distortion and Incompressibility of Rubber.** Jaeger-Aviation.

582,559. **Cast Synthetic Resin Articles.** W. E. F. Gates and Imperial Chemical Industries Ltd.

582,582. **Shock Absorber.** Gabriel Co.

582,587. **Inflatable Cores for Use in Casting Hollow Concrete Units.** C. B. Mathews and J. G. Ambrose.

582,662 **Liquid Fuel Containers.** B. J. Balfe and Imperial Chemical Industries, Ltd.

582,675. **Heels for Boots and Shoes.** G. Greaves.

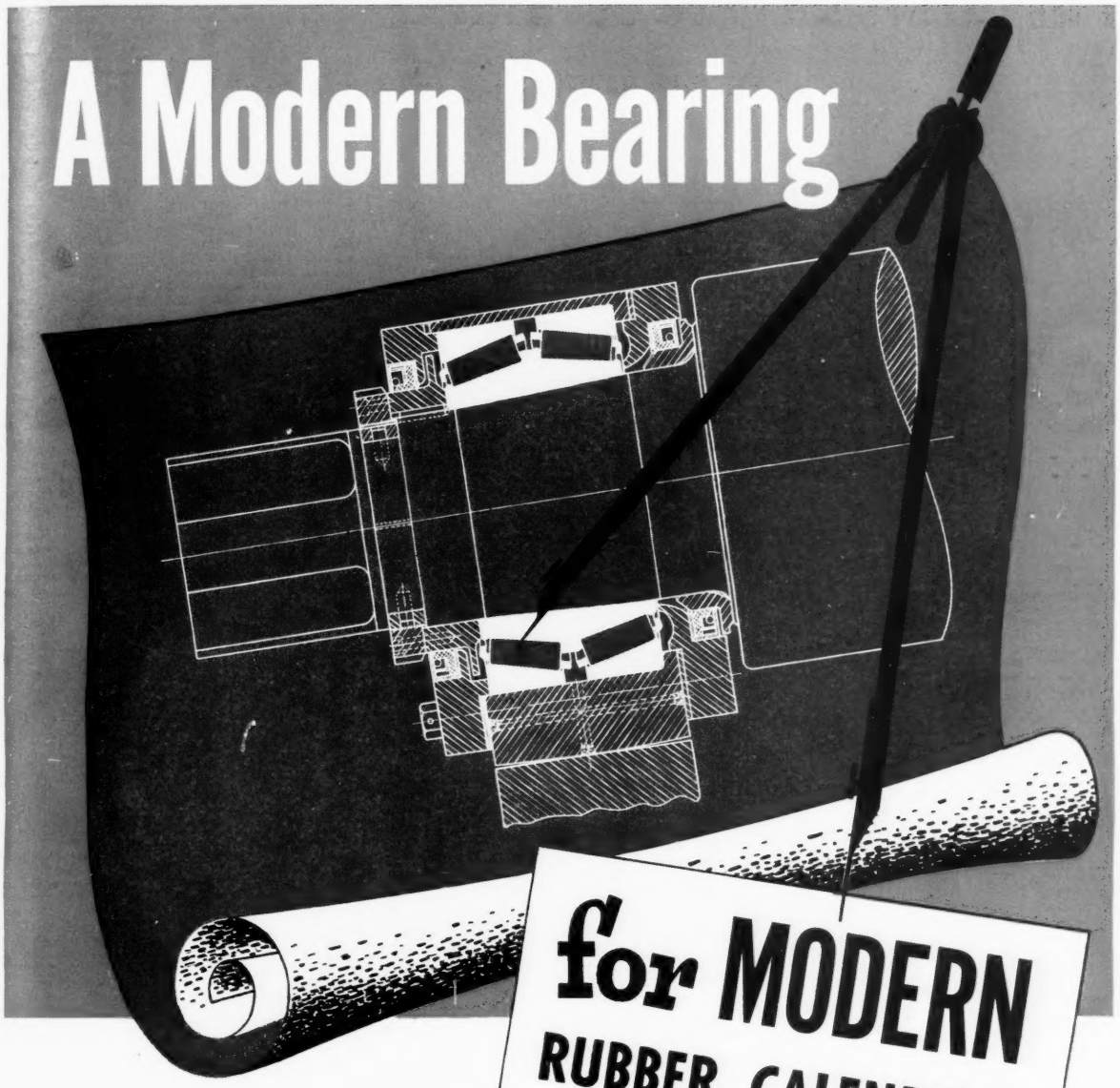
582,704. **Fuel Tank Installations in Aircraft.** Boulton Paul Aircraft, Ltd., and J. D. North.

PROCESS

United States

2,411,693. **Raw Tire Stock from Compounded Rubber Material.** W. G. M. Peare,

A Modern Bearing



for MODERN RUBBER CALENDERS

The Timken Balanced Proportion Bearing application as shown in the drawing was designed to assure greater accuracy, increased production, longer life and lower maintenance in today's — and tomorrow's — rubber calenders.

These bearings will give your calenders increased roll neck strength and rigidity; close and constant control of product thickness; maintenance of proper running clearance at any operating temperature; free rolling motion regardless of the R.P.M. of the bearing or speed of the calender rolls.

You need these bearings *now*. Consult the calender builder or our engineers regarding their application to new or existing machines. Look for the trade-mark "TIMKEN" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

48 YEARS OF ENGINEERING AND METALLURGICAL DEVELOPMENT

Cork, Eire, and G. H. B. Yoxon, Erdington, Birmingham, assignors to Dunlop Rubber Co., Ltd., London, both in England.

2,411,724. **Tubular Abrasive Element Including a Tube of Synthetic Resin or Rubber and Abrasive Powder.** R. J. Hill, Cranford, N. J., assignor to Western Electric Co., Inc., New York, N. Y.

2,411,847. **Extruding an Oxidizable Thermoplastic Material.** J. Bokeeno, Sewell, N. J., assignor to Radio Corp. of America, a corporation of Del.

2,412,042. **Rubber Shoe.** E. Gottschalk, New York, N. Y.

2,412,429. **Striping a Thermoplastic Flexible Strip Material.** E. L. Slinghluff, Bath Township, and D. R. Scheu, Akron, both in O, assignors to B. F. Goodrich Co., New York, N. Y.

2,412,586. **Improved Method of Fine Grinding, in a Cyclic Manner, Rubber Scrap Free from Fibrous Material.** T. M. Knowland, Belmont, assignor to Boston Woven Hose & Rubber Co., Boston, both in Mass.

Dominion of Canada

437,853. **Outsole of Vulcanizable Material.** J. Gregg, New Hope, Pa., U. S. A.

437,863. **Composition Sole of Rope and Rubber.** J. E. L. Ryan, Danbury, Conn., U. S. A.

437,945. **Inner Sole from Sheets of Thermoplastic Material.** Udylite Corp., assignee of L.eR. B. High and G. C. T. Lindh, all of Detroit, Mich., U. S. A.

438,030. **Coiled Structure from a Nylon Monofil.** Canadian Industries, Ltd., Montreal, P. Q., assignee of H. J. Doell, Carneys Point, N. J., U. S. A.

438,089. **Fuel Containers of Cloth, Oil-Resistant Polymer, and a Reinforcing Material.** Imperial Chemical Industries, Ltd., London, assignee of L. Shakesby, Bradmore, Wolverhampton, and J. T. Watts, Blackley, Manchester, all in England.

United Kingdom

581,914. **Coating Paper.** Wingfoot Corp.

581,928. **Coating Fibrous Material.** Sylvania Industrial Corp.

582,013. **Polyvinyl Alcohol Filaments.** Johnson & Johnson (Great Britain), Ltd.

582,210. **Composite Products of Rubber and Rayon.** Dunlop Rubber Co., Ltd., J. W. Illingworth, and E. W. Madge.

582,248. **Molding Optical Elements from Synthetic Resins.** C. H. Crooks, W. A. Greenwood, D. Starkie, H. Silber, and Imperial Chemical Industries, Ltd.

582,268. **Manufacturing Rubber.** Permanente Metals Corp.

582,477. **Electric Communication Cables.** Standard Telephones & Cables, Ltd., W. K. Weston, and E. Baguley.

582,642. **Resilient Mountings.** Dunlop Rubber Co., Ltd., and G. W. Trobridge.

582,649. **Hollow Articles from a Thermoplastic Cellulose Derivative.** Courtaulds, Ltd., and H. M. Averns.

CHEMICAL

United States

2,411,516. **Ether of Endo-Ethylene-Substituted Phenyl Cyclopentanol, Which Is the Acid - Catalyzed Addition - Rearrangement Product of an Aliphatic Alcohol and an Adduct of Cyclopentadiene with Styrene.** H. A. Bruson, assignor to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,411,536. **Esterifying the Fatty Acids in a Tall Oil Mixture of Fatty Acids and Resin Acids.** F. H. Gayer and C. E. Fawkes, assignors to Continental Research Corp., all of Chicago, Ill.

2,411,554. **Coating Composition Including a Paint Consisting of Pigment and a Vehicle Composed of Unsaturated Fatty Acid Modified Alkyd Resin and a Solvent therefor, and a Texturing Material Including Finely Divided Fibrous Material Combined with Thermoset Phenol Formaldehyde Resin.** M. Riccitiello, Wilkinsburg, assignor to Westinghouse Electric Corp., East Pittsburgh, both in Pa.

2,411,557. **Liquid Phenol-Formaldehyde Resin Condensation Product.** C. H. Schuh, St. Petersburg, Fla., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,411,567. **Anhydride of a Carboxylic Acid.** J. W. Fisher, Spondon, assignor to British Celanese Ltd., London, both in England.

2,411,588. **Separating a Diolefin from Gas Mixtures Including the Diolefin, Olefins, and Acetylenes.** J. W. Packie, Green Village, and W. S. Craft, Elizabeth, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,411,590. **Limited Heat-Reactive Coating Composition Including an Acid-Reacting Vinyl Resin and a Heat-Reactive, Alcohol-soluble Resin of the Group of Urea-Formaldehyde and Melamine-Formaldehyde Resins.** G. M. Powell, 3rd, South Charleston, W. Va., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,411,599. **High Molecular Weight, Solid Interpolymer of a Methyl Acrylate and an Alpha Olefin, Obtained with the Aid of Ultra-Violet Light.** W. J. Sparks, Elizabeth, and A. H. Gleason, Westfield, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,411,655. **Condensation Products from a Thiourea Compound and a Methylol Compound of a Primary Amide.** C. Graenacher, Riehen, and R. Sallmann, Gelterkinden, assignors to Society of Chemical Industry in Basle, Basel, all in Switzerland.

2,411,665. **Lacquer Base Including an Unsaturated Cellulosic Derivative and a Plasticizer therefor.** J. B. Monier, Galt, Ont., Canada.

2,411,666. **Molding Composition Including a Cellulosic Derivative, a Plasticizer therefor, and a Filler.** J. B. Monier, Galt, Ont., Canada.

2,411,722. **Sulfur-Dioxide Modified Tetrafluoroethylene Polymer.** J. Harmon and R. M. Joyce, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,411,773. **The Use of 3, 3, 3', 3'-Tetramethyl-1, 1'-Spirobisindane-5, 5', 6, 6'-Tetrol, as Accelerator in Curing Polychloroprene.** B. W. Bender, Cupsaw Lake, N. J., assignor to United States Rubber Co., New York, N. Y.

2,411,808. **Separation of Hydrocarbons from Water Miscible Liquids by Distillation and Washing.** W. H. Rupp, Mountainside, and R. O. Wright, Elizabeth, N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,411,819. **Dry Metal Sulfonates of Improved Oil Solubility from an Oil Solution of the Sulfonates.** E. Amott, Berkeley, assignor to Union Oil Co. of California, Los Angeles, both in Calif.

2,411,822. **Liquid Phase Dimerization of a Conjugated Diolefin Containing Fewer Than 7 Carbon Atoms.** T. F. Doumani, Long Beach, assignor to Union Oil Co. of California, Los Angeles, both in Calif.

2,411,823. **Unsaturated Ketones Produced by Reacting an Olefin with an Acid Anhydride of a Saturated Aliphatic Carboxylic Acid in the Presence of a Catalyst Including Acetyl Sulfoacetic Acid.** T. F. Doumani, Long Beach, and J. F. Cuneo, assignors to Union Oil Co. of California, both of Los Angeles, both in Calif.

2,411,826. **Introducing an Elemental Halogen of the Group of Bromine and Chlorine into a Mixture of Vinyl Acetate and an Alcohol to Produce Haloacetals.** E. M. Filachione, Philadelphia, Pa., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,411,839. **Homogeneous Thermoplastic Composition Adapted for Molding, Calendering, Etc., from a Halogen Containing Rubber Derivative Milled with a Substance Capable of Retarding Heat Disintegration of the Derivative.** W. C. Calvert, Chicago, Ill., assignor to Wingfoot Corp., Akron, O.

2,411,840. **Composition Including a Rubber Hydrohalide and Litharge.** W. C. Calvert, Gary, Ind., assignor to Wingfoot Corp., Akron, O.

2,411,841. **Subjecting Rubber Hydrohalide and Sulfur to Vulcanization Temperature in a Press.** W. C. Calvert, Gary, Ind., assignor to Wingfoot Corp., Akron, O.

2,411,860. **Rendering Textiles, Fibers etc. Water-Repellent by Treating with a Higher Molecular Ketene Containing a Substituent Hydrocarbon Radical of at Least 4 Carbon Atoms, and Heating Substantially in the Absence of a Solvent.** W. Hentrich, Rodleben, and R. Hueter, Dessau-Rosslau, both in Germany, assignors, by mesne assignments, to Heberlein Patent Corp., New York, N. Y.

2,411,869. **Reaction Products Obtained by the Addition of Nascent Thiocyanic Acid in an Aqueous Medium to Cyclopentadiene-Monoolefinic Adducts with Consequent Rearrangement of the Ring System of the Adducts.** H. A. Bruson, assignor to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,411,878. **Laminating Non-Vulcanizable, Non-Fibrous Synthetic Film Material with Butadiene Copolymer Material with the Aid of an Adhesive Composition Including a Polyvinyl Butyral.** A. Hershberger, Kenmore, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,411,884. **In Plasticizing Rubber, the Incorporation of the Product Produced by Subjecting a Thiophenol to the Action of an Aldehyde and an Aromatic Amine.** R. J. King, New Canaan, and G. W. Thielcke, Norwalk, assignors to King & Lang, Inc., South Norwalk, all in Conn.

2,411,899. **Heating a Polymer of an Ester of Acrylic Acid with an Alkali Metal Salt of Silica Dispersed therein to Cure the Polymer.** S. T. Semegen, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,411,904. **Rosin Ester Modified Dicarboxylic Acid-Glycol Resin.** G. Spiller, assignor to Hercules Powder Co., both of Wilmington, Del.

2,411,905. **Adhesive from a Water Dispersion of a Mixture of Reclaimed Rubber, a Compatible Resinous Tack-Producer therefor, and a Soap Forming Acid, to Which Alkali Is Added.** H. N. Stephens, White Bear, assignor to Minnesota Mining & Mfg. Co., St. Paul, both in Minn.

2,411,943. **Compositions Including a Material from the Group of Natural Rubber and Rubber-Like Polymers of Butadiene-1, 3, Isoprene, Piperylene, and 2-Chloro-Butadiene-1, 3 Mixed with a Carboxylic Acid Ester of One of a Group Consisting of Indanols and Alkyl Substituted Indanols.** F. J. Soday, Baton Rouge, La., assignor to United Gas Improvement Co., a corporation of Pa.

2,411,954. **Polymeric Addition Product of a Monomeric Hydrocarbon Polythiol and a Polymeric Polyunsaturated Ester of a Polyhydric Alcohol with an Unsaturated Acid, Which is, Apart from the Carboxyl Group, Hydrocarbon.** W. J. Burke, Marshallton, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,411,962. **Preparation of Vinyl Esters, Which Includes Bringing Acetylene and a Carboxylic Acid in the Vapor Phase in Contact with Zinc Chromite.** W. V. Freed, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,411,982. **Obtaining a Polychlorinated Straight-Chain, Aliphatic Carboxylic Acid Halide.** C. W. Theobald, Christiania Hundred, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,412,014. **Making Formaldehyde from Natural Gas.** T. K. Sherwood, Wellesley, assignor to Godfrey L. Cabot, Inc., Boston, both in Mass.

2,412,034. **Molecularly Oriented Fiber from a Cold-Drawn Copolymer of Acrylonitrile Ethyl Acrylate and Ethyl Methacrylate.** G. F. D'Alelio, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,412,072. **Gas Expanded Rubber Including Closed Cells Containing Non-Oxiding Mixture of Nitrogen and Ammonia.** R. C. Bascom, Port Clinton, O., and D. Roberts, deceased, late of New York, N. Y., by D. Roberts, Jr., executor, assignors to Rubatex Products, Inc., both of New York, N. Y.

2,412,096. **Continuous Process for Promoting Thermal Vapor Phase, Hydrocarbon Reactions to Obtain Valuable Reaction Products.** W. W. Odell, El Dorado, Ark., assignor to Lion Oil Co., a corporation of Del.

2,412,148. **In Self-Sealing Fuel Tanks Having an Interliner of Butadiene Copolymer, the Improvement of a Thin Layer of a Composition Consisting of a Polyvinyl Butyral and an Insoluble, Infusible Polyhydric Pheno'aldehyde Resin Firmly Bonded to the Interliner.** A. Hershberger, Kenmore, N. Y., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

2,412,182. **Water-Dispersed Tacky Rubber Adhesive.** H. N. Stephens, White Bear, assignor to Minnesota Mining & Mfg. Co., St. Paul, both in Minn.

2,412,214. **Solvent and Freeze-Resistant Synthetic Rubber Prepared by Polymerizing in Aqueous Emulsion a Mixture of a Conjugated Diolefin Hydrocarbon, a Nitrile, and a Monochloro Substituted Conjugated Diolefin.** A. H. Gleason, Westfield, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,412,216. **Rubber-Like Composition Including Blending a Polymerized Butadiene Rubber, a Polyvinyl Ester, and a Mutual Solvent Including an Organic Condensation Product of Formaldehyde and Turpentine under Acidic Conditions.** M. T. Harvey, East Orange, N. J., assignor to Harvel Research Corp., a corporation of N. J.

2,412,264. **Sulphonating an Organic Condensation Product Obtained by Subjecting a Mixture of a Phenol Free of Unsaturated Hydrocarbon Substituent to a Condensing Reaction in the Presence of a Katenoid Condensing Agent.** M. T. Harvey, South Orange, N. J., assignor to Harvel Corp., a corporation of N. J.

2,412,296. **Depolymerizing Acrylate Resins by Wetting them with an Adequate Aqueous Liquid, Subjecting to the Action of a Direct Flame of Temperature above 400°C. for a Short Time to Decompose the Resin to a Liquid, and Rapidly Removing it from the Zone of Reaction to Prevent Volatilization.** C. L. Shapiro, Beaver Falls, Pa.

2,412,308. **Producing Vinyl Chloride by Reacting Acetylene with Hydrogen Chloride in the Presence of the Products of Pyrolysis of Ethylene Dichloride.** J. F. Weiler, Lewiston, assignor to Mathieson Alkali Works, Inc., New York, both in N. Y.

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2,412,327. **Composition Which Is Relatively Free from Swelling or Hardening by Gain or Loss of Moisture in the Atmosphere and Consists of Casein and a Compatible Amide of a Sulphonic Acid Containing a Single Benzene Nucleus.** G. E. Ellerman, Milwaukee, Wis., assignor to Pittsburgh Plate Glass Co., Allegheny County, Pa.

2,412,389. **Monochloro Para-xylylene Dichloride.** O. W. Cass, Niagara Falls, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,412,437. **Preparation of an Unsaturated Aliphatic Nitrile of the General Formula $C_n H_{2n} - {}_3Cn$, Where n is a small number Greater Than 1 and not Greater Than 6.** C. R. Wagner, Utica, O., assignor to Phillips Petroleum Co., a corporation of Del.

2,412,470. **Treating a Solid Body with a Composition Containing as the Active Ingredient thereof a Mixture Consisting of Trimethyl Silicon Chloride and Silicon Tetrachloride to Render It Water Repellent.** F. J. Norton, Schenectady, N. Y., assignor to General Electric Co., a corporation of N. Y.

2,412,475. **Curing a Plastic Polymer of an Ester of Acrylic Acid by Heating with an Alkali Metal Salt of Stannic Acid.** S. T. Semegen, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,412,476. **Curing a Plastic Polymer of an Ester of Acrylic Acid by Heating with an Alkali Metal Salt of Vanadic Acid.** S. T. Semegen, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,412,504. **Improving for Polymerization Monomeric Products Such as Styrene and Butadiene by Heating the Monomer Containing an Inhibiter Such as Hydroquinone to Approximately Boiling Point While in Contact with Carbon Black Thereby (1) Causing Initial Polymerization of a Small Amount of the Monomer, (2) Adsorbing the Inhibiter from the Monomer, and (3) also Adsorbing the Initially Formed Polymer.** G. Goldfinger Brookline, assignor to Godfrey L. Cabot, Inc., Boston, both in Mass.

2,412,589. **Alkylating a Resinified Material Derived by Resinifying an Aromatic Hydrocarbon with an Aldehyde.** E. Lieber, West New Brighton, N. Y., assignor to Standard Oil Development Co., a corporation of Del.

2,412,590. **An Elastomer Adapted for a Chewing Gum Base Consisting of Methacrylic Acid Ester Polymer Having in the Ester Radical 3 or More Carbon Atoms and an Ester of Abietic Acid.** B. N. Lougovoy, Jackson Heights, N. Y.

2,412,592. **Paper Liner Facing Material Including a Paper Base and a Coating Including Chiefly Vinyl Polmer Resin.** C. E. Maier, Elmhurst, Ill., assignor to Continental Can Co., Inc., New York, N. Y.

2,412,611. **Molding Powder Consisting of Granules of Colloided Thermoplatsic Composition Including Essentially Cellulose Acetate, the Molding Powder Yields an Article Resistant to Stresses Produced by Impact at Low Temperatures, such as −40° F.** W. E. Gloor, New Brunswick, N. J., assignor to Hercules Powder Co., Wilmington, Del.

2,412,668. **Magnetic Body Including Particles of Magnetic Material Insulated and Bonded by the End-Products of a Heat-Treated Composition Including a Water-Soluble Soap of Glycerol-Phthalate Resin and Casein.** A. F. Bandur, Berwyn, Ill., assignor to Western Electric Co., Inc., New York, N. Y.

2,412,693. **Wettable Coating for Vinylite Sheeting Consisting of a Composition Including Ethyl Lactate, Methyl Cellosolve Acetate, and Cellulose Acetate.** G. P. Waugh and W. O. Kenyon, assignors to Eastman Kodak Co., all of Rochester, N. Y.

2,412,762. **Process for Manufacture of Butadiene Which Includes Reacting Propene with a Formaldehyde under Substantially Anhydrous Conditions and at a Temperature from 75 to 115° F. in Contact with a Zirconium Chloride Condensation Catalyst, to Effect Condensation of the Propene with the Formaldehyde.** A. R. Workman, Malverne, assignor to Cities Service Oil Co., New York, both in N. Y.

2,412,799. **Preparing Thiocyano Aliphatic Ethers of Endoethylene Cyclopentanols.** H. A. Bruson, assignor to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,412,801. **Chemical Complex Obtained by Heating an Adduct of a Diarylguanidine and an Acidic Salt of a Metal from the Group of Zinc, Aluminum, Cadmium and Tin, with Substances from the Group of a Reaction Product of Formaldehyde and a Thiazole Derivative and a Mixture of Paraformaldehyde and a Thiazole Derivative.** A. R. Davis, Riverside, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,412,823. **Recovering Furfural from Admixture with Hydrocarbons Having Boiling Points so Close to That of Furfural as to Be Difficult to Separate by Distillation.** B. J. Mayland, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,412,880. **Separating Butadiene in a Highly Concentrated State from a Hydrocarbon Material Including also Normal Butane, 1-Butene, and 2-Butene, by Azeotropic Distillation.** F. E. Frey, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,412,911. **Improved Process for the Production of Butadiene from a Cracked Petroleum Fraction.** H. W. Scheeline, Elizabeth, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,412,921. **Heteropolymer Including an Olefin having 3 to 5 Carbon Atoms and One Ethylenic Double Bond per Molecule with an Ether Having 4 to 8 Carbon Atoms and 2 Isolated Ethylenic Double Bonds per Molecule; the Ether Has an Oxygen Link between Hydrocarbon Groups Containing Each of the Two Isolated Ethylenic Double Bonds.** W. J. Sparks, Cranford, and R. M. Thomas, Union, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,412,928. **Alkyl Esters of Aceto-Acetic Acid.** K. H. W. Tuerck, Banstead, and H. J. Lichtenstein, London, both in England, assignors to Distillers Co., Ltd., Edinburgh, Scotland.

2,412,936. **Production of Cyclopentene by the Catalytic Dehydrogenation of Cyclopentane.** H. J. Hepp, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

Dominion of Canada

437,944. **Improving the Wearing Quality of Extruded Products Like Artificial Filaments, Films and the Like, by Incorporating a Simple Polyacrylic Derivative in a Viscose Solution.** Tootal Broadhurst Lee Co., Ltd., assignee of J. T. Marsh and W. H. Roscoe, all of Manchester, England.

437,959. **Waterproof Coating Composition Including a Solution of Polystyrene, a Wax, Another Thermoplastic Resin, and, as the Sole Plasticizer, the Distillate Obtained by Distilling Polymerized Alpha-Methyl-Paramethyl Styrene at a Temperature between 147 and 184° C. at a Pressure of one MM. of Mercury.** C. Dreyfus, New York, N. Y., assignee of Bjorn Andersen, Newark, N. J., both in the U. S. A.

437,996. **For an Optical Element, a Clear Adhesive Consisting of a Copolymer of a Composition Including One Substance Containing the $CH_2{=}Cx$ Group, and an Compatible Polymerizable, Unsaturated Alkyd Resin Which is a Polyester of Maleic Acid.** American Cyanamid Co., New York, N. Y., assignee of E. L. Kropa, Old Greenwich, Conn., both in the U. S. A.

438,017. **Polyamides.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. H. Charch, Buffalo, and F. P. Alles, Williamsville, both in N. Y., U. S. A.

438,021. **Surfacing Composition Containing Solid Granular Ethyl Cellulose Dispersed in a Liquid Vehicle Containing a Drying Oil Modified Alkyd Resin.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. J. Zolad, Detroit, Mich., U. S. A.

438,023. **Insoluble Cellulose Derivatives Obtained for a Soluble Cellulose Derivative Containing Free Hydroxyl Groups Reacted with a Crystalline, Monomeric Polyalkoxymethyl Melamine.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. Coolidge and J. S. Reese, IV, both of Wilmington, Del., U. S. A.

438,026. **Sulphur Vulcanized Furylethylene Polymer; the Polymer Is of the Class of Polyfurylethylene and Copolymers of Furylethylene and a Vinylidene Compound Having Only One Ethylenic Linkage.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. J. Mighton, Wilmington, Del., U. S. A.

438,031. **In Calendering Synthetic Resin and Cellulose Derivative Compositions on to a Fabric, the Improvement of Incorporating in the Composition Dibutyl Ammonium Oleate.** Canadian Industries, Ltd., Montreal, P. Q., assignee of D. J. Sullivan, Fairfield, Conn., U. S. A.

438,032. **For Removable Adhesive Sheets, an Adhesive Coating Including Polyisobutylene Having a Molecular Weight of 80,000 to 100,000 and an Anti-Adhesive Transfer Agent from the Group of Dibutyl Phthalate, Dibutyl Sebacate, Stearic Acid, and Dioctyl Phthalate, with Mineral Oil as Extender.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. W. Yule, Leominster, Mass., U. S. A.

438,041. **Elastomer Obtained by Heating an Intimate Mixture of Sulfur and an Interpolymer of Ethylene and an Organic Monocarboxylic Acid Ester of Vinyl Alcohol Which Has Been Pyrolyzed at a Temperature between 250 and 400° C.** Canadian Industries, Ltd., Montreal, P. Q., assignee of A. McAlevy, D. E. Strain, and F. S. Chance, Jr., all of Wilmington, Del., U. S. A.

438,042. **Heating Element Including a Semi-Conducting Film of a Polymeric Organic Non-Conducting Composition Containing an Alkyd Resin, a Polyvinyl Acetal Resin, and Insolubilizing Agent, for the Acetal Resin, and a Carbon Black.** Canadian Industries, Ltd., Montreal, P. Q., assignee of D. E. Edgar, Westport, and D. J. Sullivan, Fairfield, both in Conn., U. S. A.

438,071. **Protective and Decorative Lacquer and Coating Composition Containing an Oleoresinous Varnish Base and a Vinyl Resin.** Continental Can Co., Inc., New York, N. Y., assignee of C. E. Maier and S. L. Fluss, Chicago, Ill., and E. C. Pfeffer, Troy, N. Y., both in the U. S. A.

438,084. **For Protecting Metal Articles during Shipment, Protective Composition Including Ethyl Cellulose, Solvent Plasticizer, Non-Solvent Exuding-Type Plasticizer, and Thermoplastic Resin.** Hercules Powder Co., assignee of H. C. Phillips, both of Wilmington, Del., U. S. A.

438,217. **An N-Carbamyl Thiazyl Sulphamine.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. H. Ebelke, Naugatuck, Conn., U. S. A.

438,248. **Improving the Stability of an Image Formed of Iodine Contained in a High Polymer Having a Plurality of Hydroxyl Groups by Treatment with an Aqueous Solution of a Water-Soluble Boron.** Polaroid Co., assignee of E. H. Land, both of Cambridge, Mass., U. S. A.

438,255. **Chlorinating Propylene via Substitution.** Shell Development Co., San Francisco, assignee of F. F. Rust and W. E. Vaughan, both in Berkeley, both in Calif., U. S. A.

438,257. **Reacting 2-Chlor-Butene-2 in the Liquid Phase with Chlorine under the Influence of Light and in the Deliberate Presence of Oxygen and Recovering 2, 3-Dichlor-Butene-1.** Shell Development Co., San Francisco, assignee of G. W. Hearne, Berkeley, both in Calif., U. S. A.

438,358. **Reclaiming Waste Rubber by Heating in the Presence of Inert Flue or Exhaust Gas of Low Oxygen Content.** North British Rubber Co., Ltd., assignee of A. Johnston, both of Edinburgh, Scotland.

438,373. **Continuous Process of Converting Butadiene-1,3 to a Mixture of Chlorinated Hydrocarbons Predominating in 1,2-Dichlorbutene-3 and 1,4-Dichlorbutene-2.** Shell Development Co., San Francisco, assignee of G. W. Hearne, Berkeley, and D. S. La France, Walnut Creek, all in Calif., U. S. A.

438,376. **Production of Ethyl Chloride from Ethane Which Is Contaminated by the Presence of Oxygen.** Shell Development Co., San Francisco, assignee of W. E. Vaughan and F. F. Rust, both of Berkeley, both in Calif., U.S.A.

438,377. **Continuous Process for the Production of Alkyl Chlorides.** Shell Development Co., San Francisco, assignee of S. A. Ballard, Berkeley, both in Calif., U.S.A.

United Kingdom

581,897. **Polymeric Substances Containing Fatty Oil Acid Radicals.** L. Berger & Sons, Ltd., D. H. Hewitt, and F. Armitage.

581,899. **Polymerization Products.** Imperial Chemical Industries, Ltd.

581,900. **Carboxylic Acids.** Imperial Chemical Industries, Ltd.

581,901. **Chlorinated Olefins.** Imperial Chemical Industries, Ltd.

581,946. **Liquid Coating Compositions.** A. Abbey (Carborundum Co.).

581,979. **Interpolymers of Iso-Olefins with Tertiary Triolefins.** Standard Oil Development Co.

581,994. **Amino Ethers.** Wingfoot Corp.

581,995. **Copolymerization Products.** Distillers Co., Ltd., J. J. P. Staudinger and C. A. Brighton.

582,006. **Insulation Materials.** British Celanese Ltd.

528,016. **Polymerization of Methyl Methacrylate in the Presence of Aliphatic Thiols.** Imperial Chemical Industries, Ltd.

582,019. **Organic Pigments and Molding Powders.** Calico Printers' Association, Ltd., L. A. Lantz, and A. Schofield.

582,060. **Vinyl-Chloracetylenes.** Society of Chemical Industry in Basle.

582,093. **Interpolymers of Ethylene and Organic Vinyl Esters.** Imperial Chemical Industries, Ltd.

582,134. **Polystyrene.** A. Boake, Roberts & Co., Ltd., and B. T. D. Sully.

582,167. **Polymerization of Esters of Acrylic Acid and Derivatives thereof.** Imperial Chemical Industries, Ltd.

582,235. **Water Dispersible Casein Urea Formaldehyde Composition.** W. Teape & Co. (1919), Ltd., H. F. Rance, and G. F. Glover.

582,247. **Molding Powders.** Leicester, Lovell & Co., Ltd., and H. A. Collinson.

582,266. **Polymers.** P. Davies, D. K. Peacock, J. E. Fearey, and Imperial Chemical Industries, Ltd.

582,305. **Vulcanization of Synthetic Rubber.** Monsanto Chemical Co.

582,316. **Dithiofuorates.** Wingfoot Corp.

582,327. **Polystyrene.** A. Boake, Roberts & Co., Ltd., and B. T. D. Sully.

582,334. **Solid and Semi-Solid Polymers and Interpolymers of Ethylene.** Imperial Chemical Industries, Ltd.

582,345. **Cation-Exchange Materials.** Permutit Co., Ltd., and A. Klein.

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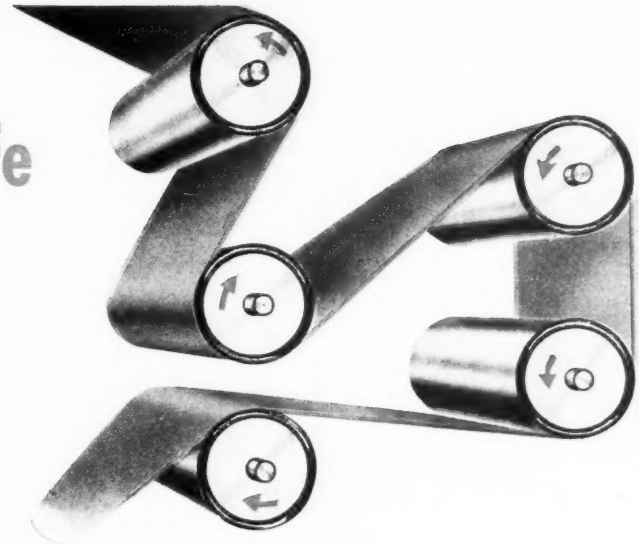

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Process Products

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Socony-Vacuum Process Products

TUNE IN THE MOBILGAS PROGRAM — MONDAY EVENINGS, 9:30, E.S.T. — NBC

582,348. **Polymeric Materials.** Imperial Chemical Industries, Ltd.

582,448. **Synthetic Resins.** P. H. Rhodes.

582,517. **Modification of the Properties of Articles Derived from Nylon.** J. R. Lewis, D. McCreath, and Imperial Chemical Industries, Ltd.

582,535. **Manufacture of Basic Esters and Basic Amides of 1-Phenyl-Cycloalkyl-1-Carboxylic Acids and the Quarternary Amonium Compounds thereof.** W. W. Groves. (Geigy Akt.-Ges.)

582,543. **Rubber-Like Composition.** Wingfoot Corp.

582,571. **Diolefin Copolymers.** Standard Oil Development Co.

582,663. **Polymeric Organic Compounds Containing Chlorine.** Imperial Chemical Industries, Ltd.

582,568. **Reclaiming Rubber.** J. and S. C. Lewis.

582,700. **Concentration of Aqueous Dispersions of Neoprene.** E. I. du Pont de Nemours & Co., Inc., and F. N. Wilder.

582,614. **Adhesive Compositions.** United States Rubber Co.

MACHINERY

United States

2,411,558. **Apparatus for Tire Repairing.** C. M. Semler, Cuyahoga Falls O.

2,411,659. **Tire Building Apparatus.** F. W. Manning, Palo Alto, Calif.

2,411,687. **Tire Retreading Device.** H. V. James, Denver, Colo.

2,412,187. **Apparatus for Forming Continuous, Biaxially Oriented Sheet of Solvent-Free Organic Polymer.** F. E. Wiley, Hartford, R. W. Canfield, West Hartford, R. S. Jesionowski, Hartford, and J. Bailey, West Hartford, Conn., assignors to Plax Corp., Hartford, both in Conn.

2,412,638 **Rubber Seal Aging Tester.** A. D. Swensen, Washington, D. C.

2,412,736. **Device for Repairing Pneumatic Tire Tubes.** H. V. James, Denver, Colo.

Dominion of Canada

438,025. **Film Extruder.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. E. Coleman, Buffalo, N. Y., U. S. A.

438,281. **Apparatus for Forming a Coating About a Strand.** Western Electric Co., Inc., assignee of Telephone Laboratories, Inc., both of New York, N. Y., assignee of J. R. Boettler, Chatham, N. J., and R. Burns, Garden City, N. Y., both in the U.S.A.

United Kingdom

582,137. **Apparatus for Polymerizing Olefinic Materials.** Standard Oil Development Co.

582,613. **Apparatus for the Manufacture of Electric Power Cables.** Okonite-Callender Cable Co., Inc.

UNCLASSIFIED

United States

2,411,668. **Airplane Tire Prerotating Means.** C. A. Pavey, Seattle, Wash.

2,411,909. **Cable Cutter.** R. Temple, Swissvale, Pa., assignor to Temple Velocity Equipment, Inc., Wilmington, Del.

2,412,501. **Forming a Square-Bottom Bag from Multiple-Wall Material.** C. E. Gardner, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,412,524. **Fatigue Test for Tire Cord.** G. D. Mallory, assignor to Wingfoot Corp., both of Akron, O.

2,412,664. **Coupling for Tubes.** J. N. Wolfram and W. Maky, assignors to Parker Appliance Co., all of Cleveland, O.

Dominion of Canada

438,306. **Hose Coupling.** T. E. Racine, Quebec City, P. Q.

438,322. **Coupling Device for Tubes.** Automotive Products Co., Ltd., assignee of W. H. J. Brock, both of Leamington Spa, Warwick, England.

United Kingdom

582,251. **Measurement of Power Losses in Electrical Insulating Materials.** J. M. Fleming.

582,421. **Couplings for Pipes, Tubes, Etc.** Thompson Products, Inc.

582,530. **Conveyors for Web Material.** Dunlop Rubber Co., Ltd., H. Willshaw, H. Smith, and F. A. Davenport.

TRADE MARKS

United States

425,485. **Servicised.** Cork-rubber and sponge rubber sheets. A. C. Fischer, doing business as Servicised Products Co., Chicago, Ill.

425,489. Representation of a shield containing the words: **"Phillips 66."** Golf balls. Phillips Petroleum Co., Bartlesville, Okla.

425,490. Representation of a shield containing the words: **"Phillips 77."** Golf balls. Phillips Petroleum Co., Bartlesville, Okla.

425,500. **Mystik.** Adhesive tapes. Chicago Show Printing Co., Chicago, Ill.

425,501. **Simplastic.** Rubber glazing strips. Hallam, Sleigh & Cheston, Birmingham, England.

425,521. **Liquid Envelope.** Resinous coating. Better Finishes & Coatings, Inc., Newark, N. J.

425,525. **Crystalite.** Shower curtains. S. V. Boland, doing business as Boland Mfg. Co., Chicago, Ill.

425,532. Representation of an octagon containing the word: **"Agchem."** Accelerators. Agawam Chemicals, Inc., West Springfield, Mass.

425,549. **Cordtone.** Rainwear, shower curtains, etc. Asher & Boretz, Inc., New York, N. Y.

425,552. **Reslon.** Synthetic resins. Monsanto Chemical Co., St. Louis, Mo.

425,613. **Pipeco.** Flexible pipe couplings. Pipe Couplings, Inc., New York, N. Y.

425,614. **Formo-Met.** Arch supports. Scholl Mfg Co., Inc. Chicago, Ill.

425,691. **Servicised.** Rubber eave closure strips and rubber tile flooring. A. C. Fischer, doing business as Servicised Products Co., Chicago, Ill.

425,702. Representation of a triangle containing the word: **"Jolo."** Rainwear, shower caps, etc. Jolo Merchandise Co., Inc., New York, N. Y.

425,718. **Justrite.** Corsets, girdles, etc. Universal Brassiere & Justrite Corset Co., Inc., New York, N. Y.

425,734. **Osage by Reeves.** Raincoats. Reeves Bros., Inc., New York, N. Y.

425,771. **Corsair.** Erasers. National Pencil Co., Shelbyville, Tenn.

425,772. **Salon.** Erasers. National Pencil Co., Shelbyville, Tenn.

425,777. **L'Abri.** Corsets, girdles, etc. H. Kfopfer, Toms River, N. J.

425,813. **Wordmaster.** Erasers. Scripto Mfg. Co., Atlanta, Ga.

425,852. **Stedgrip.** Rubberized sheeting. Stedfast Rubber Co., Inc., Mattapan, Mass.

425,869. **Warmeze.** Footwear. Bristol Mfg. Corp., Bristol, R. I.

425,872. **Balanced Posture.** Footwear. O'Donnell Shoe Corp., Humboldt, Tenn.

425,879. Representation of a coat of arms and the words: **"London Bobby Cape."** Raincapes. A. M. McDougall, Birmingham, Mich.

425,904. Representation of a square with the words: **"A Roselash Original."** Raincoats. Rose Lash, New York, N. Y.

425,920. **Pat Allen.** Raincoats. Hess Bros., Allentown, Pa.

426,007. **Plastruder.** Extrusion presses. National Rubber Machinery Co., Akron, O.

426,010. **Ameroco.** Storage batteries. American Oil Co., Baltimore, Md.

426,020. **Pumpmaster.** Hand tire pump. Federal Auto Products Co., Chicago, Ill.

426,090. **Lorraine.** Dress shields. Lorraine Mfg. Co., Pawtucket, R. I.

426,129. **Lipol.** Soles and slabs. J. M. Huber, Inc., New York, N. Y.

426,147. **Joy.** Dress shields. Rand Rubber Co., Brooklyn, N. Y.

426,179. **Wip.** Golf balls. Gimbel Bros., Inc., New York, N. Y.

426,183. **Aggressor.** Golf balls. I. D. Malbrough, Jr., Chicago, Ill.

426,184. **Radar.** Golf balls. I. D. Malbrough, Jr., Chicago, Ill.

426,185. **Trump.** Golf balls. I. D. Malbrough, Jr., Chicago, Ill.

426,187. **Challenger.** Hose and belting. Lee Rubber & Tire Corp., doing business as Republic Rubber Division, Youngstown, O.

426,189. **Loop-the-loop.** Games. R. L. Santos, doing business as R. L. Santos Co., Cambridge, Mass.

426,224. **Laher.** Batteries. Laher Spring & Tire Corp., Oakland, Calif.

Trade Lists Available

The Commercial Intelligence Division of the United States Department of Commerce, Washington, D. C., recently compiled the following trade lists, mimeographed copies of which may be obtained by American firms from this Division at $1 a list for each country.

Automotive Equipment Importers and Dealers—Greece; Syria.

Natural Rubber Exporters—Siam.

Office Supplies and Equipment Importers and Dealers—Bermuda; British Guiana; Iraq; Nicaragua; Surinam; Haiti; Jamaica; Turkey; Union of South Africa; Bolivia; Portugal.

Rubber Goods Manufacturers—Colombia.

Foreign Trade Opportunities

The firms and individuals listed below have recently expressed their interest in buying in the United States or in United States Representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Import Opportunities

H. S. Blair, P. O. Box 1076, Panama: chicle or perillo gum.

Th. D. Montijn, 413 Keizersgracht, Amsterdam, C, Netherlands: rubber flat belts, V-belts, and steam packing.

Elie Philippe Kfoury, representing Zaidan Kfoury Trading Co. and Philip D. Kfoury, both of Cairo, Egypt: tires, batteries, automotive spare parts.

Auto-en Motor-handen Import Maatschappij, N. V., 333 Maastricht, Netherlands: tires and tubes for passenger cars, trucks, tractors, motorcycles, and airplanes.

Export Opportunities

Ditta Cesare Frilli, 2 Via Condotta, Florence, Italy: hose.

L. Molteni & Co. dei Fratelli Alitti S. A., 4 Via Mossoti, Florence, Italy: gums.

R. E. Jeffries, of R. E. Jeffries, Pty. Ltd., 168 Day St., Sydney, Australia: electrical insulating materials and appliances.

Knut Tolstad, representing AB A. Ekstroms Maskinaffar, 10 Vattugatan, Stockholm, Sweden: rubber transmission and conveyor belting.

G. A. Flaigg, Elisabetherstr. 60, Basel, (P. O. Box 55, Zurich), Switzerland: rubber goods.

Penrose, Corrick & Whitehead, Ltd., Elliott Block, Elliott St., Auckland, C. I., New Zealand: gumboots and rubber footwear.

Sauco (Pty.) Ltd., P. O. Box 2492, Durban, South Africa: rubber goods; radios; car accessories; novelties; sports equipment.

Chen Shu Kai, manager, Great China Finance & Development Corp., Hong Kong: chemicals; machinery; electrical appliances; rubber sundries; plastic goods.

Maria Celia Wolff, Bartolome Mitre 2632, Buenos Aires, Argentina: plastic materials.

Victor Jules Gerard, Dr. S., 51 Rue Wery, Brussels, Belgium: chemical products; plastics; industrial products.

João Sahagoff, representing Irmãos Sahagoff & Cia., of Rio de Janeiro, Sao Paulo, Curitiba, and Porto Alegre, Rua dos Andradas 52, Rio de Janeiro, Brazil: children's balloons; fountain pens; plastic ware.

Brijratan Shrivratan Mohatta, representing B. R. Herman and Mohatta, Ltd., Karachi, India: plastic goods and molding powders.

C. Matarazzo S. A., Commercial e Industrial Corrientes 5666, Buenos Aires, Argentina: toys; kitchenware.

Orlando Motti, Avenida Dr. Vincente Machada 488, Ponta-Grossa, Parana, Brazil: rubber boats, fishing and hunting equipment.

Palmiro Guidotti, 26 Via Garibaldi, Viareggio, Lucca, Italy: bicycle tires.

Francois Gorra, 33 Rue Cherif Pasha, Alexandria, Egypt: rubber articles; sportswear; hospital supplies.

Alexander Pressman, 481 Roman Rd., Bow, London, E. 3, England: toys; balloons.

Louis Briou, 46 Rue Neuvice, Liege, Belgium: rubber balls and toys.

Anciens Etablissements Cracco Frères S. A., Rue F. Burvenich, Gentbrugge Nord-lez-Ghent, Belgium: elastic bands.

Ateliers & Comptoir Industriels Robert Landuyt, 13-27 Blvd. Elisabeth, Bruges, Belgium: transmission and conveyor rubber belting.

E. Neuville, 15 Rue Zenobe Gramme, Charleroi, Belgium: sporting goods and shoes; medicine balls, footballs, bladders; elastic suspensories; ankle and knee bands.

S. I. G. L. A. (Società Italiana Gomma Lavorazione Affini), 1 Corso Palermo, Turin, Italy: synthetic and natural rubber.

Here's valuable information

on Monsanto Plasticizers and Resins

The subject of plasticizers has such wide and general appeal, that Monsanto has recently revised and issued a 60-page book, "Plasticizers and Resins — Specifications and Application Data" . . . It contains much detailed information of considerable daily value — suggested uses, specifications, descriptions, tables, graphs, and various data on flash points, viscosities, pour points, solubilities . . . A copy will be sent promptly on request. Contact the nearest Monsanto District Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Cincinnati, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

Some Suggested Uses for Monsanto Plasticizers

Alkyd Resins • Benzyl Cellulose • Cellulose Acetate • Cellulose Acetobutyrate • Cellulose Acetopropionate • Chlorinated Rubber • Ethyl Cellulose Natural Resins • Neoprene • Nitrocellulose Phenolic Resins • Polystyrene • Polyvinyl Acetate Polyvinyl Butyral • Polyvinyl Chloride • Polyvinyl Formal • Protein Compounds (Soybean or Corn Protein, Casein, Glue) • Santolite Resins • Urea Formaldehyde Resins.

MONSANTO CHEMICALS
SERVING INDUSTRY . . . WHICH SERVES MANKIND

OTS Bibliography Reports on Rubber Products—VI

THE printing of abstracts of these reports on rubber and rubber products from the Department of Commerce's "Bibliography of Scientific and Industrial Reports" was started in the June, 1946, issue of India RUBBER WORLD *as a service to our readers since it was believed that the circulation of the Department of Commerce publication was not duplicating that of* India RUBBER WORLD *to any considerable extent. We are still convinced that this condition is essentially true. However the amount of material that has become available for republication is so large that for practical reasons, in order to continue this service, it will be necessary to eliminate some of what are considered to be the less important of these abstracts and to reprint this material in smaller type in a manner somewhat similar to our listing of the latest United States and British patents.*

The "Bibliography of Scientific and Technical Reports," which lists reports received from civil and military agencies of the United States Government and from cooperating foreign governments and covers a wide range of subjects in addition to rubber and rubber products, is issued weekly by the Department of Commerce, Office of Technical Service. The Bibliography is sold by the Superintendent of Documents, Government Printing Office, Washington, D. C., on a subscription basis, $10 for one year. The complete reports either on microfilm or as photostats, as indicated below, may be obtained from the Department of Commerce.

Depolarization Due to Secondary Scattering. U. P. Strauss. (WPB Office of Assistant Rubber Director for Research and Development of Synthetics. General Report 13.) PB 9684. 1944. 4 pages. Photostat $1; microfilm 50¢. In another paper by P. Debye and E. S. Elyash, "Depolarization in Dilute Solutions" (PB 9679), the ratio of the scattered intensity to the primary intensity was shown to be affected by a correction term known as Cabannes' factor. To determine this factor and also to obtain some information concerning the optical properties of the dissolved particles, the depolarization of several latex solutions was determined by visual photometry by the method of Cornu. It was observed that the depolarization increased strongly with the concentration of the dissolved particles. To obtain quantitative results the depolarization of one latex sample was measured at different concentrations. The part of the depolarization that changes with the concentration is a measure of the ratio of secondary to primary scattering. A detailed investigation shows that the depolarization can be expressed entirely as function of the turbidity (defined as the fractional decrease of the incident intensity over unit distance) and the dimensions of the part of the solution illuminated by the incident light beam. Thus for a circular light beam of radius a the depolarization is given by the formula

$$\rho = \rho_n + \frac{3\pi}{32}\,\alpha\tau - \tfrac{1}{4}(\alpha\tau)^2 + \frac{7\pi}{64}(\alpha\tau)^3$$

A similar model formula has been developed for a rectangular beam. With the aid of the theory, we find by extrapolation that ρ_n for the latex is not greater than 1.8%. The report includes a graph and table.

Infrared Spectra and Structure of Synthetic Rubbers. J. V. White and P. J. Flory. (WPB Office of Assistant Rubber Director for Research and Development of Synthetics. General Report 10). PB 9681. 1944. 22 pages. Photostat $2; microfilm 50¢. The infrared spectra of a number of synthetic rubbers have been investigated by the personnel of the Standard Oil Development Co. for the twofold purpose of obtaining information regarding fundamental polymer structure, and of establishing methods of identification and analysis of rubber and synthetic rubber mixtures. To date, complete spectra of Buna S, Perbunan, Buna-85, Butyl rubber, polybutene, and natural rubber have been measured and analyzed. Indications regarding polymer structure have been deduced from the spectra. The infrared method has been demonstrated as a means for establishing the nature of the chemical bonds existing in synthetic rubber molecules. Absorption bonds characteristic for each of the following have been found: natural rubber, Buna S, Perbunan, Buna-85 and Butyl rubber, and polybutene. These bands may be used for identifying any of the above in an unknown rubber, or for their quantitative determination in a mixture composed of a combination of the above rubbers. An appendix discusses correlations between molecular structures and spectra. The report includes graphs.

Abstracts of Technical Data in the Field of Synthetic Rubber Seized by the Alien Property Custodian. Frederick W. Breuer. (WPB Office of Assistant Rubber Director for Research and Development of Synthetics. General Report 2.) PB 9675. 1943. 20 pages. Photostat $2; microfilm 50¢.[1]

Review of the German Patent Literature Relating to Synthetic Rubber. Frederick W. Breuer. (WPB Office of Assistant Rubber Director for Research and Development of Synthetics. General Report 3.) PB 9676. 1943. 39 pages. Photostat $3; microfilm 50¢. This report surveys what is hoped to be the complete German patent art on diolefin polymers and copolymers of rubber-like properties. It discusses: I. mass polymerization: polydiolefins; reduction of time requirements of polymerization reaction; Butyl-type rubbers; polyolefins (Vistanex, Oppanol); modifiers; processing; and stabilization. II. emulsion polymerization: early work; postwar development; copolymerization; modifiers; and interrupting polymerization (short stopping). III. processing. IV. compounding and vulcanization: tables of compounding and vulcanization recipes; plasticizers; and extenders. V. rubber-like and plastic masses: polysulfide condensation products; polyvinyl compounds; and vegetable and fish-oil condensation products. VI. end uses: adhesives; substitutes for rubber, balata, and gutta percha; coatings; and hard rubber. Throughout the discussion are references to a table of German patents. This table gives the inventor or assignee, patent number, date of application, and date of publication. Photostatic copies of all of the patents given in the list are on file in the Office of the Assistant Rubber Director for Research and Development of Synthetics. In addition a large number of photostats of German patents on resinous vinyl and acryl polymers not in this survey are on file.

I. G. Farbenindustrie, Ludwigshafen, Synthetic Materials [M of S(RMD), B of T]. British Intelligence Objectives Sub-Committee. (BIOS Evaluation Report 281). PB 9545. 1945. 1 page. Photostat $1; microfilm 50¢. A résumé of the information gained by an inspection of this plant is given. The investigators were particularly interested in: polyethylene or Lupelin; polystyrene; also oppanol and polyvinyl chloride. It was stated that the Germans made polystyrene to the extent of five tons a month and mixed it with polyethylene captured from British aircraft. Polystyrene is made (1) as a block polymer by a single-phase thermal process, and (2) as an emulsion polymer. The block polymers have better electrical characteristics than the emulsion polymers and are used for R. F. cables. The order of development of R. F. cables in Germany is given. Four types of polyvinyl chloride, or Igelit, are manufactured: Grade F for films, R for tubes, G for rubber substitute, and K for cable.

Orangization of Polymerization Information. R. F. Dunbrook and P. S. Greer. (RFC Office of Rubber Reserve, Research and Development Section. ORR Nos. CR-764 and CD-424). PB 13342. 1945. 58 pages. Photostat $4; microfilm 50¢. This report is a composite of four different reports on visits made by American investigators under the sponsorship of the Rubber Sub-Committee of Technical Industrial Intelligence Committee to the leading synthetic rubber plants in Germany: Schkopau Leverkusen, Ludwigshafen, and Huls. It gives a summary of German research and development, and polymerization techniques. As early as 1926-27 a great deal of research had been done in Germany on the polymerization of butadiene and isoprene in which the hydrocarbon was either mass polymerized or polymerized in latex emulsion. However the efforts to duplicate the structure of natural rubber were unsuccessful. A turning point was reached when it was realized that it was not so important to synthesize natural rubber as to obtain cheaply and economically chemical subsances which, while unlike natural rubber in structure, would show similar or even better qualities than others more closely related chemically to the natural product. On this basis German research and production developed in general on lines similar to those in the United States and finally resulted in the mass production of a great number of more or less rubber-like elastomers meeting different specifications as to tensile strength, heat and oil resistance, etc. The report gives a historical background on the development of elastomer chemistry in Germany and then describes the techniques of the different synthetic rubber plants visited. It enumerates all substances which have been investigated or actually used in elastomer production such as the dienes, vinyl compounds, modifiers, and antioxidants.

(To be continued)

[1] This report was published in India RUBBER WORLD, Mar., Apr., May, and June, 1944.

Malayan Rubber Statistics

The following statistics have been received from Singapore by way of Malaya House, 57 Trafalgar Square, London, W.C.2, England.

Ocean Shipments from Singapore and Mayalan Union—In Tons

To	November, 1946	
	Sheet and Crepe	Latex, Concentrated Latex, Revertex (Dry Rubber Content)
Australia	441	....
Chile	125	....
China	1,540	....
Czechoslovakia	450	....
Denmark	391	6
Hong Kong	304	....
Italy	375	....
New Zealand	80	....
Spain	550	....
Sweden	1,920	....
Union of South Africa	245	....
United Kingdom	19,514	686
U. S. A.	52,544	479
TOTAL	78,479	1,171

Foreign Imports of Rubber in Long Tons

Singapore Imports from	November, 1946	
	Dry Rubber	Wet Rubber (Dry Weight)
Banka and Billiton	16	....
British North Borneo	1,702	6
Dutch Borneo	1,506	9
Labuan	120	....
Other Dutch Islands	51	3
Rhio	537	20
Sarawak	2,384	41
Siam	176	19
Sumatra	8,188	3,333
TOTAL	14,680	3,431
Malayan Union Imports from		
Burma	196	1
Siam	2,573	8
Sumatra	1,039	382
TOTAL	3,808	391

Dealers' Stocks—November, 1946

Singapore, Penang, and Province Wellesley

	Tons
TOTAL ALL GRADES	51,766

Port Stocks—Malayan Union—November 1946

	Tons
Harbor Board (Wharves & Lighters)	605
Malayan Railways (Godowns)	8,477
Other Port Stocks	8,033
TOTAL	17,115

Production—Malayan Union November 1946

	Tons
Estates	23,389
Small Holdings (estimated)	29,173
TOTAL	52,562

Announcing...

monoplex

a new name for Resinous Products' Monomeric Plasticizers

To make them easier for you to remember, The Resinous Products & Chemical Company announces the redesignation of their monomeric plasticizers. The following is a list of the complete line, new and old names:

MONOPLEX DBS	**(Dibutyl Sebacate)**
MONOPLEX DOS	**(Dioctyl Sebacate)**
MONOPLEX DOS Distilled	**(Distilled Dioctyl Sebacate)**
MONOPLEX DCP	**(Dicapryl Phthalate)**
MONOPLEX 5	**(Dibenzyl Sebacate)**
MONOPLEX 7 Distilled	**(Distilled Dibutoxy Ethyl Sebacate)**

Remember the new name, MONOPLEX, for your plasticizing needs. The products remain unchanged . . . to provide you with the same uniformity, quality and dependability.

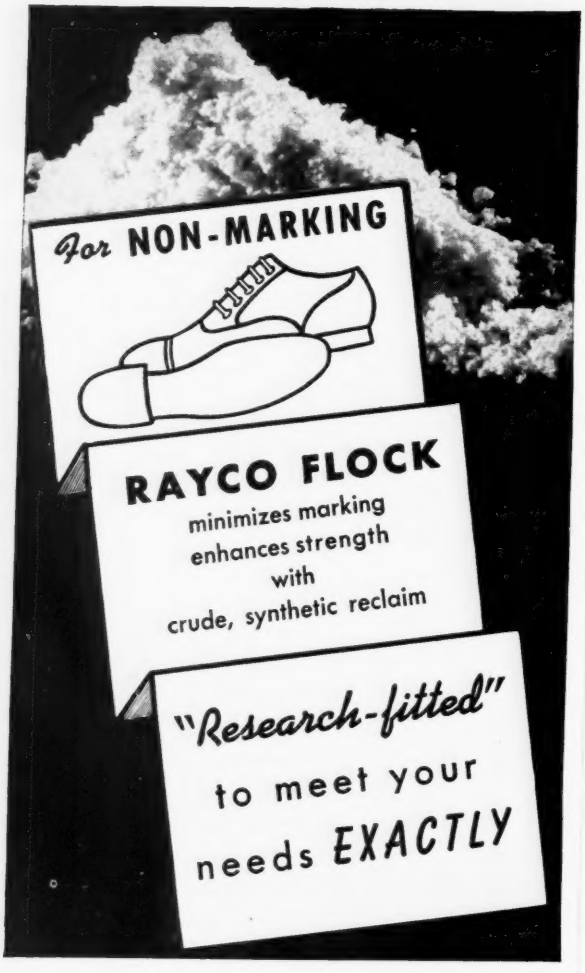
THE RUBBER CHEMICALS DEPARTMENT

Represented by Cia. Rohm y Haas, S. R. L., Carlos Pellegrini 331, Buenos Aires, Argentina, and agents in principal South American cities

THE RESINOUS PRODUCTS & CHEMICAL COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Rayco Flock



WORKING SAMPLES FREE

Rayon Processing Co. of R. I., Inc.

PIONEER PRODUCERS OF
COTTON FILLERS FOR PLASTICS

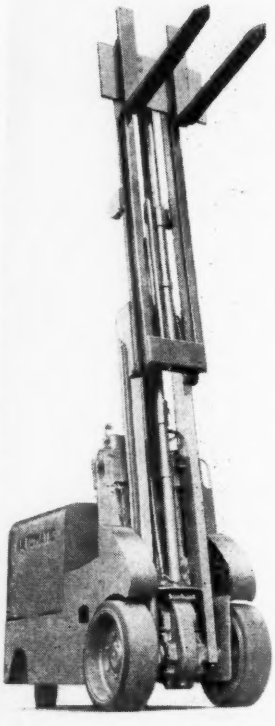
102 TREMONT ST., CENTRAL FALLS, RHODE ISLAND

New Machines and Appliances

Fork Truck

THE Automatic Sky Lift, a new telescopic, tilting, hydraulic-lift electric fork truck, designed to meet specifications outlined by users, has been announced by Automatic Transportation Co. The first of the company's 1947 line, the Sky Lift is scheduled for early first-quarter production.

The Sky Lift features what is claimed to be the highest lift of any fork truck ever designed with a standard 83-inch collapsed height. It will stack to 130 inches from the floor to the top face of the forks; yet it will pass through a standard seven-foot door when collapsed. This action is made possible through the use of independent rams to raise each section of the telescopic lift. The forks and uprights move independently, the forks raising to the top of the upright before the latter begins to extend.



Automatic Sky Lift Fork Truck Showing Full Extension

The truck's exclusive "Newmatic" pneumatic controller operates as the electric counterpart of an automobile automatic gearshift, providing automatically timed sequence of movement through all four horizontal speeds. Any one of the speeds may be selected by the extent to which the foot accelerator is depressed; regardless of the speed selected, the controller starts the truck in low speed, both forward and reverse, and moves automatically through the faster speeds. This feature is important for safety and economy as acceleration is thus smooth and even; tire slippage is eliminated; and the peak load on the electrical system is reduced without lessening acceleration speed.

FOR GOOD ABRASION RESISTANCE
USE PHILBLACK A

FOR FURTHER DETAILS, SEE AD ON PAGE 598

A NEW WHITE
and
BRIGHT ***Pigment...***

WHITETEX

- **Can be used in pastel colors of rubber, synthetic rubber and plastics, especially vinyls.**

ALSO... **as an extender for Titanium Pigments, Lithopone, Zinc Oxide.**

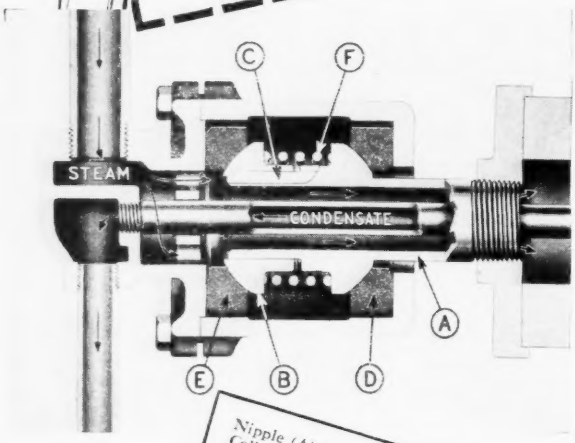
WHITETEX **has a G. E. brightness of 90-92 and very good visual color.**

• SAMPLES UPON REQUEST •

MOORE & MUNGER

33 RECTOR STREET NEW YORK 6, N. Y.

. . . it's the biggest little trouble-saver in the mill . . .



Nipple (A) is connected to roll or drum. Collar (B) is keyed to it (C), but fits loosely so pressure can fill entire housing to act as sealing force. Both seal ring (D) and bearing ring (E) are of carbon-graphite, eliminate packing and oiling. Spring (F) is for initial seating only. Type B Joint shown; other types, sizes for all needs.

In terms of physical size alone, the Johnson Joint could hardly be called big machinery. But in its ability to save time and trouble, and promote plant efficiency, its stature approaches anything the industry has ever seen.

The Johnson Joint was designed to go after the old stuffing box and steam fit troubles in a business-like way, and it literally knocks the stuffing out of them. There's no packing of any kind. There's no oiling required, ever. There's no adjusting — the higher the pressure, the tighter the seal. There's little to fear from misalignment — with provision for both lateral and angular movement built right in. Note besides how neatly it provides for more efficient syphon drainage, through the same head that admits the steam.

In dollars and cents, what does all this add up to? Well . . . enough at least to pay the cost of switching over to Johnson Joints in just a short while. Enough certainly to make the Johnson Joint too big to overlook.

THE JOHNSON CORPORATION
869 WOOD STREET, THREE RIVERS, MICHIGAN

JOHNSON Rotary Pressure JOINTS

Write for literature and the name of your nearby Johnson representative.

Another important feature is the use of silicone varnish insulation throughout the lift's electrical system, permitting operation at high temperatures and ordinary overloads. The lift's brake is a newly designed traction brake of the disk, air-cooled fin type. The brake is self-alining, has long life, and gives braking through an area of 85 square inches.

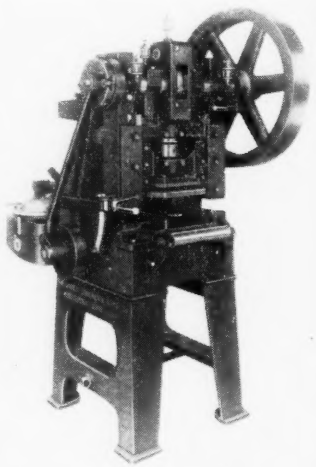
The hydraulic lift mechanism also has special flow-control valves which allow lifting, lowering, tilting, or any combination thereof, under any conditions of load or unload. In addition these valves move the tilt always at the same speed, regardless of load or lift conditions. Maximum lowering speed is preset and constant under all load conditions, eliminating danger of damage to loads by rapid dropping.

Like all Automatic trucks, the Sky Lift offers complete "dead-man control"; all current is automatically shut off when the operator's foot is off the accelerator. The brake is interconnected with the swivel-mounted seat so that the truck is automatically and completely braked when the operator leaves the seat. The compact design features of the lift enable the use of maximum rubber on drive wheels. The overall width is 33 inches across 20- by 7-inch drive tires on the 4000-pound capacity model. The drive wheels are reversible for uneven floor conditions, allowing a four-inch increase in width to 37 inches for greater stability where necessary.

The steering system uses the perfected caster-type, shockproof trailing axle developed by the company to eliminate kick-back of the steering wheel over rough floors. Besides the dead-man control, other safety features of the Sky Lift include low and high limit relief valves for fork elevation, full vision of forks, whether empty or loaded, diamond-tread rubber floor matting for positive footing, simplified automobile-type controls, and driver location well back of uprights to eliminate danger to driver from falling loads.

Rubber Cutters

THE James Coulter Machine Co., Bridgeport, Conn., has announced the addition of two new rubber cutting machine models for continuous volumetric control and stripping of rubber heels, soles, taps, and other molded products. The new machines, Models A2 and A3, will cut rubber both with or across the stock grain, either singular or in multiples.



Coulter Model A2 for Cutting Rubber Heels and Soles

The machines are high-speed, precision made units, built for fast production. The previously existing Model A1 is for cutting heels in either long or short runs. The new Model A2 is for cutting multiple heels, half or full soles with stock grain, and the Model A3 is for cutting multiple heels and taps either with or across the stock grain.

The units are complete with volumetric plunger compressors to assure a uniform volume when the blank is cut, thus reducing the overflow in molds to a minimum. The return of hot scrap saves power cost of remilling and uses up a larger portion of the batch or mix. Removal and replacement of dies require only three to five minutes, and adjustment of the length of feed also takes approximately the same time.

Sheet Plastic Creaser

THE "Thermocreaser," an improved precision tool that not only accelerates the creasing or folding of cellulose and other thermoplastic sheetings, but also produces more effective creases or folds with repetitive uniformity, produces, it is claimed, a right-angle crease on 5-20 pt. plastic sheeting up to 30 inches wide at superior hourly rates. Creasing or folding is performed by an accurately heated, thermostatically controlled blade that

(*Continued on page 730*)

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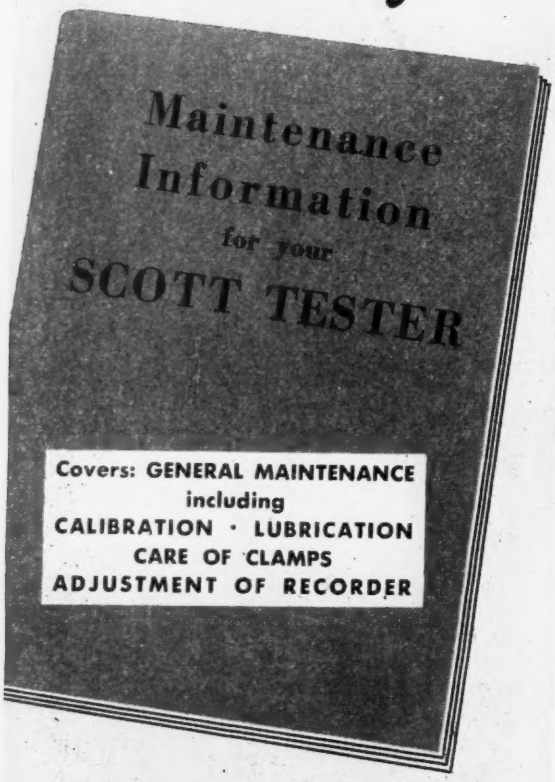

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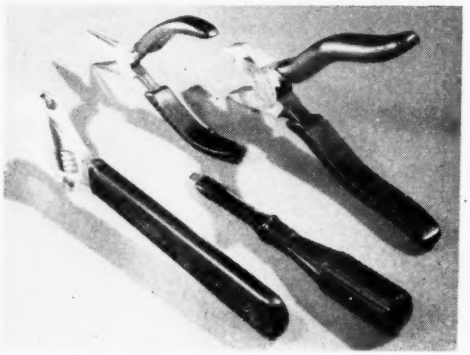

Electrician's Tools with "Cohardite" Insulated Handles

Insulated Tool Handles

DURABLE and reliable insulated handles for high-tension work tools are being made by the Connecticut Hard Rubber Co. Known by the trade name, "Cohardite," the handles are made from a combination of Geon polyvinyl plastic and Hycar oil-resistant synthetic rubber, both products of B. F. Goodrich Chemical Co. In addition to their insulation properties, the handles have excellent impact, oil, and grease resistance. The linemen's pliers shown at the top of the accompanying photograph have been tested up to 28,000 peak volts without breakdown.

Gigantic Electric Heating Pad

CONDUCTIVE rubber, improved during the war for military use, has been applied to a gigantic electric heating pad built by Goodyear Tire & Rubber Co., Akron, O., to serve as an ink-drying medium in the fabric printing industry. Said to be the biggest rubber heating unit ever made for commercial use, the pad weighs 187 pounds and is 30 feet long and 65 inches wide. It was developed to function as a table-top drying element so that multiple colors may be inked on textiles in one continuous operation.

Waterproof and highly flexible, the pad is made in "sandwich" style of specially compounded electrically conducting rubber between non-conductive sheets. Controlled by a thermostat, the heat output is eight kilowatts and is accomplished without the use of resistance wires or metallic elements.

Goodyear Conductive Rubber Heating Pad

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Freedom from unpleasant odors is an important selling point in synthetic rubber products today. PARADORS* are highly effective in eliminating such odors—both in the finished products and in the manufacturing process. They are the result of Givaudan's long research and specialized experience in the development of deodorants and re-odorants for all purposes.

PARADORS are available for all types of synthetic polymers, including Neoprene Latex. They cover a wide variety of odor characteristics and price ranges. In addition, Givaudan is prepared to develop special odorants to solve specific problems in the manufacture of rubber products.

In the production of any line of synthetic rubber articles you need specialized assistance in odor control. Givaudan can give you this service...and help you simplify and reduce the cost of deodorizing. Further information will be sent to you on request, without obligation.

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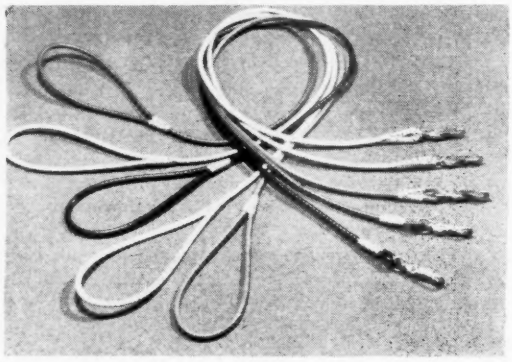
Widespread application of this new heating principle is forecast by E. W. Sanders, of Goodyear's mechanical goods division, who said that similar pads can be made in all shapes and sizes, ranging from simple heat-treating units for homes and hospitals to large, complex units for industrial use. Possibilities appear unlimited, including heated rubber channels to prevent lids of freezer units from sticking, said Mr. Sanders, who also pointed out that the heat volume can be maintained automatically from room temperature up to 170° F.

The heating unit is an outgrowth of Goodyear's wartime development of heated rubber ice guards for airplane propeller blades, according to L. B. Sebrell, company director of research and chemical products development. Special compounding of the pad's inner rubber sheets with carbon was necessary to produce electric conductivity. This technique results in efficient and uniform heating of the entire pad; the outer rubber cover serves as an insulator.



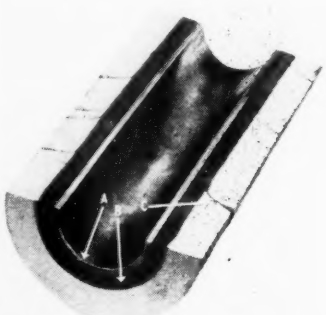
Dog Leashes Made of Vinyl Plastic

Plastic Leashes

AMONG the latest accessories for the dog are colorful plastic leashes made by Jessall Plastics. Fashioned from rayon cords coated with Geon plastic, made by B. F. Goodrich Chemical Co., Cleveland, O., the new leashes will not crack, peel, or stain and are long lasting. They are available in bright colors and can even be selected to match the clothes of the dog's owner, if it is desired.

Steel-Mill Roll

ALMOST complete resistance to damage from cuts is promised in a new roll for steel-mill pickling lines developed by Goodyear Tire & Rubber Co., Akron, O. According to W. C. Winings, manager of the mechanical goods division, and Ernest Peterson, head of industrial roll sales, this rolls utilizes an inner cover of especially developed fibrous material which guards the steel core from contact with the pickling acid.



Cross-Sectional View of Goodyear Steel Mill Pickling Tank Roll Showing: (A) Steel Core of Roll; (B) New Fibrous Inner Cover Which Protects Core From Acid Penetration; and (C) Test Cuts in Outer Rubber Cover Fail to Pierce Fibrous Layer

Known as the "Goodyear Special Hold-Down and Carrying Roll," the new product continues to utilize a high-grade acid-resistant synthetic rubber cover on the weight carrying surface. But until development of the new fibrous material, which is bonded to the steel core by a special process, cuts in the rubber surfaces of the rolls often permitted acid to reach the core and destroy it. The new fibrous material is sufficiently hard to absorb the shock of practically all cuts to which

(*Continued on page 724*)

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DC Mold Release Emulsion No. 35 forms a silicone film which keeps synthetic rubber or dirt accidentally introduced into the mold from sticking to mold surfaces.

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Postwar Trade in Rubber Goods

In the first export number of the *India Rubber Journal* to be issued since the war, detailed statistics compiled from Board of Trade Returns, and comparing average monthly figures for 1938, 1945, the first half of 1946, and for each of the months of July, August, September, and October 1946, are given to show the extent of Britain's postwar recovery in the export trade in rubber manufactures.

The figures very clearly demonstrate the marked progress made in 1946 as compared with 1945. In the latter year even the values of average monthly exports were in most cases below those of 1938, in spite of the sharply increased prices. In 1946 the average monthly values were—with one small exception (golf balls)—considerably above the corresponding value in 1938. However under present conditions a comparison of quantities is necessary for a clear picture of progress, and quantities have been indicated for all classes of rubber goods except insulated wires and cables; these underline the postwar upward swing of exports up to July, 1946. In the following two months there was a drop, ascribed in part to the fact that vacations, falling in these months, led to a reduction in the number of actual working days. But October, 1946, saw a recovery to totals which in most cases far exceeded those of July, 1946.

Average monthly exports of automobile tires in 1938 came to 108,986 units, valued at £226,122; for 1945, 19,342 units, value, £135,592; first six months of 1946, 52,402 units, value, £354,313; and for October, 105,840 units, value, £810,762. The distribution of these goods by countries shows some changes in 1946 as compared with 1938. In the latter year India was Britain's best customer for tires, taking an average of 13,012 units, value, £33,304, per month. In October, 1946, tire exports to India had twindled to 170 units, value, £521. The Union of South Africa, New Zealand, and other British countries, except British West Africa, all reduced their tire purchases, the Union of South Africa drastically, in fact. On the other hand, Palestine, which had averaged 885 units, value, £2974, a month in 1938, was the most important customer for these goods in October, 1946, taking 5,237 units, value, £52,140. The reduced tire imports by British countries, no doubt, are due to the increasing local manufacture of these goods.

The October, 1946, exports of automobile tubes, including 87,490 units, value, £84,014, compared with the monthly average for 1938 of 75,182 units, value, £21,126.

There were all-round increases in exports of rubber manufactures such as sheeting, threads, tubing, elastic materials, and proofed sheet and sheeting, especially of the latter. Exports rose rapidly from month to month in 1946, from a monthly average of 379,725 square yards, value, £61,929, in the first half of the year to 1,119,679 square yards, value, £174,856, in October, 1946. These figures compare with a monthly average of 348,580 square yards, value, £27,221, in 1938. Exports of rubber footwear, totaled 17,916 dozen pairs, value, £107,969, in October, 1946, against a monthly average of 5,375 dozen pairs, value, £8,828, in 1938.

Meetings of Institution of the Rubber Industry

At the meeting of the Manchester Section of the Institution of the Rubber Industry, November 25, 1946, Maldwyn Jones submitted a paper on "The Impact of Plastics on the Rubber Industry." At the December 16 meeting of the same section "Revision of British Standard Specification for Vulcanized Rubber" was discussed by J. M. Barst and D. A. Harper.

The feature of the meeting of the Midland Section in Birmingham on December 9 was a forum on "Electrostatic Hazards in Industry."

The West of England Section met at Trowbridge on December 11, when J. R. Shanks read a paper on "Non-Brass Bonding."

The Leicester Section meeting, December 16, featured a paper by J. S. Hunter on "A Survey of Accelerators and Curing Agents."

"Silicon Rubber" was the topic chosen by G. L. Hammond, H. R. Poole and R. C. W. Moake for the meeting of the London Section on December 17.

Invitation to Latex Conference

The Institution of the Rubber Industry is holding a conference on the production and uses of natural and synthetic rubber latices, to be held under the auspices of the Manchester and District Section on May 6 at the Grand Hotel, Manchester. An inaugural dinner will be held at the hotel on the evening of May 5. The conference program will consist of about 12 short papers dealing with every aspect of latex, including production, coagulation, preservation, concentration, transportaton, storage, specifications, compounding ingredients, and applications in industry. The subject matter will cover both natural and synthetic latices and will emphasize future trends and developments. A period of 10 minutes will be allowed for presentation of each paper, to be followed by a 20 minute discussion period. Where the presentation time is considered inadequate, authors are urged to submit copies of their papers for precirculation among the audience.

Contributions are also invited from overseas authorities on latex who plan to participate in the conference. Any such contributions should be submitted to the secretary, G. E. Nettleship, Hexagon House, Blackley, Manchester, 9.

New Companies Formed

Dunlop Rubber Co. (Scotland), Ltd., has just been formed to handle the sale in Scotland of all Dunlop goods except clothing and Semtex. The new company, which has a capital of £50,000 in £1 shares, will have on its board of directors G. E. Beharrell, Dunlop managing director, who is to be chairman; H. L. Kenward, Dunlop director of distribution; J. H. Lord, Dunlop financial comptroller, and W. Sinclair, Dunlop regional manager for Scotland.

George Pettit & Son, Ltd., London, recently was organized with a capital of £45,000 to manufacture elastic webbing and textile notions.

Elastic webbing is also to be the main product of the recently registered company of William Monk (Elastic) Ltd., of Coventry. The capital is £30,000.

The Reliable Rainwear Co., Manchester, is to be acquired by the newly organized Reliable Rainwear ("Bridgwater") Ltd., capitalized at £10,000.

Toys, games, sports goods, and the like of rubber are to be the specialties of Playlastic Toy Co., Ltd., capitalized at £21,000.

Rubberwood (Plastics), Ltd., London, is to carry on the business of inventors, manufacturers, or agents for secret or other processes, for rendering wood or other materials harder or more durable, resistant to flame, fire or heat, moisture or oil, etc. The company has a capital of £25,000.

J. Allen & Co. (Latex) Ltd., Cheltenham, newly formed with a capital of £20,000, will engage in the manufacture and repair of rubber, balata, gutta percha, compounds of or substitutes of these, tires, tubes, aprons, boots, shoes, etc.

FOR FURTHER DETAILS, SEE AD ON PAGE 598

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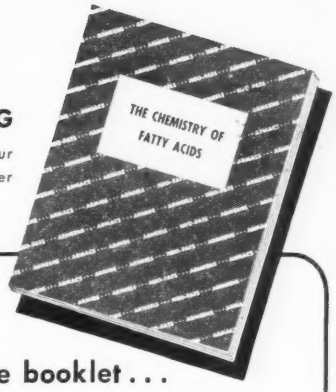

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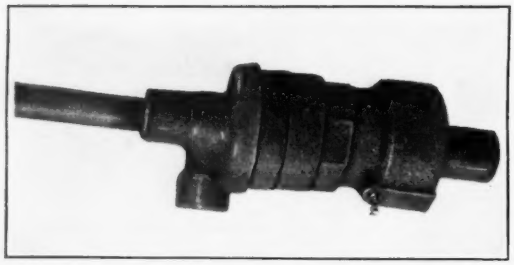

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British Rubber Industry Notes

Among the goods displayed at the Technical Exhibition held in Glasgow during November 15-27, 1946, were several types of transmission belting, rubber moldings for seals, mountings, couplings, and the like, high-pressure hose embodying high-tensile steel braid, and various applications of rubber bonded to metal. Also on view were Rediton radio heating equipment for quick preheating and welding operations in the rubber and plastics industries, and a newly invented automatic pump for automobile and bicycle tires.

Avon India Rubber Co., Ltd., reported net profit of £342,304 for the year ended September 30, 1946, which was about £66,000 more than in the preceding fiscal year. Distribution on the increased ordinary capital was 10%.

A new synthetic fiber, Terylene, has been developed in the laboratories of the Calico Printers' Association from terephthalic acid and ethylene glycol. High resistance to heat, light, microorganisms, acids, organic solvents, and bleaching agents, as well as low moisture absorption and swelling in water, are among the properties claimed for the new material. It is understood that Imperial Chemical Industries, Ltd., has acquired exclusive license for the synthetic, covering the whole world outside of the United States.

At the fifth annual general meeting of the National Association of Tire Specialists, held November 6, 1946, it was announced that plans for a tire repair school at Brentford had advanced to the stage where it could be hoped to start it in the Spring of 1947.

British manufacturers of plastics are cooperating with the British Plastics Federation in organizing a Plastic Section for the British Industries Fair to be held May 5-16, 1947. It is expected that participation by British manufacturers will be greater than ever before and that the exhibit, which is to feature basic materials, molding presses, and finished goods, will be fully representative of the industry here.

FRANCE

Rubber Containers for Latex

While investigating the manufacture of articles by thermosensitization of latex, it occurred to F. Chassaing that the process might be used for the production of rubber containers in which latex could be shipped from the plantations. The advantage of this method would be two-fold—first the container could easily be manufactured directly from latex right on the plantation, and then after arrival at destination and after it had served its original purpose, the container could be used as crude rubber.

In a recent issue of the *Revue Générale du Caoutchouc*, P. Compagnon describes results of a test shipment of latex in a number of bags made at the Dizangue Plantation in the Cameroons under his direction during his visit in February 1946. The bags, made by the Chassaing method, from latex with the addition of ZnO, (indispensable for sensitization), were for the most part unvulcanized; they were cylindrical in shape, with a narrow neck having an internal diameter of 1.5 cm., they held about 20 liters of latex each and each had a protective cover of jute.

The containers of unvulcanized rubber did not withstand the rigors of transportation very well; several burst as a result of handling after arrival in France; some burst in transit, in a few instances because of faulty construction. Those that arrived in good condition showed losses of one to two kilograms when weighed. Measurement of the dry rubber content of the latex revealed significant increases, indicating that a certain concentration of the latex had taken place, with the rubber container acting as ultra-filtering wall. A small amount of zinc from the zinc oxide had migrated to the latex.

The containers of vulcanized rubber (there were only two) arrived in perfect condition. Concentration of latex by ultrafiltration and evaporation through the walls of the bags took place here too, but to a lesser degree; it was suggested that this effect could be reduced by suitable modification of the molding process. Because only two containers of vulcanized rubber were included in the test, no definite conclusions can be drawn yet as to their reaction to the hazards of transportation. But tests made in Paris by M. Chassaing seem to warrant the opinion that none of the accidents suffered by the uncured containers would have proved injurious to those of cured rubber. Further experiments with the latter type of containers are apparently to be undertaken.

Chemistry Congress: French Institute for Oceania

The twentieth Congress of Industrial Chemistry was held in Paris, September 22-29, 1946. Among the many papers presented, the following may be mentioned as having special interest for the rubber and plastics industries: "The Permeability of High Polymers," by R. Houwink; "The Standardization of Latex Tests," P. Compagnon; "Molding Rubber Goods from Latex," A. Jarrijon; "The Bonding of Rubber to Metals; The Use of Canite," J. G. Duval and J. Gossot; "Thermosensitivization of *Hevea* Latex and the Resulting Product," by F. Chassaing; "The Plasticization of Vinyl Chloride at High Temperature," M. Michon; "New Tendencies in the Chemistry of High Polymers," M. Sana; "Statistical Calculations and Elasticity," P. Piganiol; "A New Synthetic Textile; Rhofil of Pure Polyvinyl Chloride," G. Mouchiroud; "Rubber Instruction in France," J. Le Bras; "The World Rubber Market, Evolution during the War Years, Present Position, and Future Prospects," G. Colin.

By a recent decree the Institut Français d'Oceanie (I.F.O.) has just been formed. It is to be established in Noumea, New Caledonia, and will make use of the premises set up by the Americans during the war for their Pacific headquarters. The organization will be under the direction of M. Catala, aided by a staff of young investigators.

RUSSIA

Hitherto the U.S.S.R. has imported acetylene black from Canada. Now, however, with the erection of a plant in Irkutsk, Siberia, domestic manufacture of the material has become possible, and it is claimed that the quality of the product is such that it will make imports unnecessary. The process employed is that of incomplete combustion of acetylene in a special reactor, and so far 4,000 kilograms of high-grade black are said to have been obtained.

Judging by recent reports, Russia is pursuing with undiminished vigor its aim of self-sufficiency in rubber. The new five-year plan provides for increased production of synthetic rubber and also of natural rubber from domestic rubber-yielding plants, chiefly *kok-saghyz*. The acreage of *kok-saghyz* is to be extended, and new methods of cultivation and propagation are expected to make for greater productivity and efficiency. High hopes, for instance, seem to be pinned on the innovation of planting *kok-saghyz* from cuttings instead of seed, and also on a new frost-resisting strain that has just been developed.

Cultivation of guayule is also to be extended; at present the total area under this crop in Azerbaidzhan (which seems to be the center of guayule growing) is said to be 1,000 hectares, or something under 2,500 acres; but it is hoped to double this acreage in the current year. Formerly the crop was sent outside of Azerbaidzhan for extraction and purification; but this practice will no longer be necessary since a processing factory for guayule has recently been erected here.

No figures are available of total outputs either of Russian grown rubber or Russian synthetic rubber, but unless large stocks of foreign rubber of both kinds have somehow been accumulated, Russia seems to be able to produce enough rubber for most of her own needs, with a margin for export. So far, Russia does not appear to have made any purchases of Malayan rubber, and though toward the end of the past year Singapore reported Russian inquiries about rubber, it admitted that no dealings had actually been concluded.

In the trade agreement made between the U.S.S.R. and Sweden last October, Russia undertook to supply 500 metric tons of synthetic rubber.

Mentioned among the quantity of goods sent to Russia by the United States in the first half of 1946 are rubber (natural, allied gums, and synthetics) and rubber manufactures, valued at $2,459,000. The quantity and value of unworked rubber is not specified, but the manufactures included 159,000 pairs of boots and shoes, valued at $586,000; 36,000 pairs of gloves, value, $79,000; 20,000 automobile tire casings, value, $645,000; 17,000 inner tubes for automobiles, value, $66,000; 273,000 pounds belting, value, $151,000; 250,000 pounds hose and tubing (except garden hose) value, $124,000; and 65,000 pounds packing, value, $16,000.

Russia has turned her attention to plastics, too, and recent press dispatches mention a new plastic called Inerit for which some unusual properties seem to be claimed. It is said to be 10 times lighter than cork and to have a thermal con-

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ductivity 18 times less than that of felt. An important use appears to be for the production of rail coaches, and two large factories are reportedly already being constructed for this purpose.

LATIN AMERICA

ARGENTINA

The governments of Argentina and Brazil have outlined agreements which, if ratified by the Congress of each country, would assure Argentina of supplies of rubber, tires, and various other Brazilian products, while Brazil would obtain from Argentina wheat and other foodstuffs. According to the agreement Argentina was to receive 5,000 truck tires during the remainder of 1946 and 40,000 each of truck and automobile tires during 1947. During the period 1948-1951, Argentina would buy from Brazil such additional amounts of needed tires as Argentina could not herself produce. At the same time Brazil would send 3,000 tons of crude rubber in the last half of 1947 and 5,000 tons annually during the period of 1948-51.

Argentina has also made a trade agreement with India by which she undertakes to send about 300,000 tons of foodstuffs to India in return for large quantities of jute and facilities for obtaining truck tires, among other items.

MEXICO

A plan is being considered for erecting a plant to manufacture carbon black from the large amounts of natural gas to be found in the Poza Rica section of Mexico.

At present Mexico uses about 6,000,000 pounds of carbon black annually, of which 60% goes to the rubber industry, 35% to the paint industry, and the rest to various other consumers. It is doubted that this comparatively small amount could be produced economically; so manufacture would either have to be undertaken on a larger scale, which would involve the finding of foreign markets for the surplus output, or the government would have to aid the industry by subsidies or concessions.

Steel-Mill Roll

(*Continued from page 718*)

pickling tank rolls are subjected, while itself remaining immune to any damage which may be caused by acid seeping through the cuts.

The roll's synthetic rubber cover is bonded in turn to the fibrous material. A newly developed bonding process assures tight adhesion of the material to both the roll core and cover throughout the roll's service life. Regardless of the diameter of each of the new-type rolls, the protective fibrous material is applied to each core in a quarter-inch layer. Similarly, the rubber weight-carrying surfaces of the rolls remain about ¾-inch in thickness. Being armored against acid penetration, the core has a virtually unlimited life, and full service of the original rubber surface is therefore gained before re-covering is found to be necessary.

Editor's Book Table

BOOK REVIEWS

"Contribution to the Physics of Cellulose Fibres." P. H. Hermans. Volume III. Monographs on the Progress of Research in Holland during the War. Edited by R. Houwink and J. A. A. Ketelaar. xvi + 221 pages. Elsevier Publishing Co., Inc., 215 Fourth Ave., New York 3, N. Y. 1946. Paper, 6 by 8½ inches. Illustrations. Price $4.

This volume is a report on some of the work done during the war at the Institute for Cellulose Research of the AKU and affiliated companies at Utrecht. A series of investigations into the structure of cellulose and its interactions with water are discussed. Consideration is given to sorption, density in various liquids, double refraction, and X-ray diffraction in an attempt to use these tools to develop a logical and consistent picture of the physical nature of cellulose. Perhaps the word celluloses could be used in place of cellulose, for, in spite of the chemical identity of the fibers used, large variations in orientation, degree of crystallinity, and technical processing are considered.

The book is designed to be a research report rather than a review and as such is of more interest to research workers in the field than to casual readers or students. The large amount of data reported makes the book valuable to anyone interested in the fundamental physical nature of cellulose, especially its interaction with water, either in the industrial or academic field. The interpretive nature of the work makes it very stimulating and controversial.

The first two chapters consist of a short general introduction and a discussion of the materials used. Particular stress is placed on the use of so-called "model filaments" which are thick nearly isotropic filaments of regenerated cellulose. A large proportion of the most interesting data in the book is taken using these "model filaments" or comparing them to commercial fibers.

The third chapter discusses the sorption properties of cellulose fibers. Emphasis is placed on the idea that the cellulose-water system is a homogeneous mixture in the amorphous regions rather than a heterogeneous condensation of water on internal surfaces in the fiber. The statement is also made that in regenerated fibers the ordered as well as the disordered regions of the fiber are swollen by water with X-ray evidence offered on this point. A theory of sorption based on the formation of two hydrates is built up and applied with qualitative success to various sorption phenomena.

In chapter four density determinations in various liquids are discussed. It is pointed out that the traditional macroscopic concept of density breaks down in the case of materials containing pores of molecular dimensions and liquids capable of wetting such materials. The density determined in organic liquids which do not penetrate into the cellulose proper is considered the closest approximation to the traditional density. The volume contraction occurring on swelling with water is considered to be a mixing effect similar to that occurring in the system sulfuric acid-water rather than the result of the adsorbed water. A parallelism between density and amount of crystalline material is also noted.

Chapter five contains some review material on the optical behavior of anisotropic systems. An attempt is made to correlate optical properties with orientation in amorphous and crystalline regions and degree of crystallinity in the fiber.

Chapter six is devoted to a discussion of X-ray diffraction work. Evidence on orientation from X-ray methods is used to supplement the work in the preceding chapter on optical methods.

In addition there are three appendices by J. J. Hermans on theoretical aspects of the work, and a valuable short section on the experimental techniques used in obtaining the data used.

The data and new concepts and treatments introduced make this volume an important and interesting contribution to the literature on cellulose. Each individual reader will have his own criticisms of the interpretations of the data offered since little of the work is in finished form and many assumptions are involved in the theoretical parts. The book suffers from a lack of consideration of recent developments by other researchers in the field and omission of a review of pertinent data on cellulose-water interactions from other sources, especially measurements of mechanical properties. This can, of course, be excused since the work was done under conditions so trying that it is amazing that anything was accomplished at all.

The reviewer recommends the book highly to all readers interested in the physical aspects of cellulose fibers.

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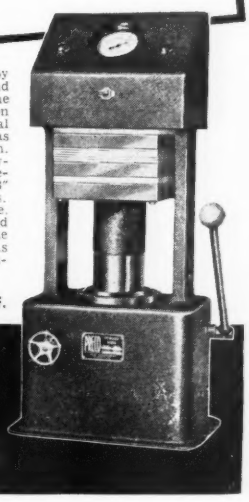

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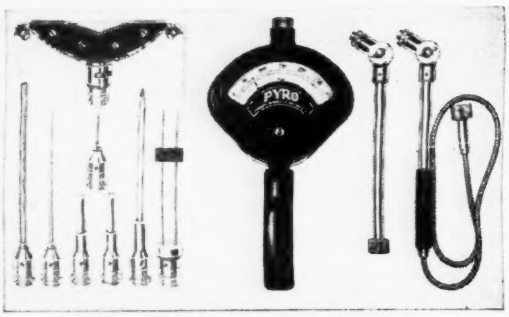

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"Handbook of Chemistry." Sixth Edition. Compiled and edited by Norbert A. Lange, assisted by Gordon M. Forker. With an appendix of mathematical tables and formulae by Richard S. Burington. Handbook Publishers, Inc., Sandusky, O. Fabrikoid, 8 by $5^1/_2$ inches, 2,082 pages. Price, $7.

This revised and enlarged sixth edition of the standard reference work on chemical and physical data retains the appearance and formation of previous editions. As such, a critical review of the new edition is unnecessary, the comprehensive nature and value of previous editions of the handbook being well known by all workers in the chemical field.

As it was believed that the limit in size of a one-volume work had been reached with the fifth edition, for the first time some of the subject matter from previous editions has been omitted from the new edition to make room for the new extension of revised tables and for subject matter appearing for the first time. Two tables, "Pipes, Valves and Fittings," and "Flow of Water and of Gas in Pipes," on strictly engineering aspects, have therefore been deleted.

Perhaps the most important change in this edition is the completely revised and enlarged table of physical constants of inorganic compounds, which now includes 2,603 compounds with a corresponding list of more than 1,300 synonyms. For the first time, where available, data on refractive index are given in this table. Subject matter appearing for the first time include modern concepts of matter, which gives information on neptunium and plutonium; numerical values of the gas constant; and composition of sea water. Tables enlarged or rewritten, in addition to that on inorganic compounds, include: periodic arrangement of the elements; heat and free energy of formation of compounds; ionization constants of acids and bases; electromotive series of metals and alloys; critical constants of gases; factors for reducing gas volumes to normal temperature and pressure; correction for emergent stem in liquid-in-glass thermometers; true capacity of glass vessels; coefficients of linear expansion; and density of aluminum chloride solutions. No changes have been made in the data on rubber; as in previous editions, the information on synthetic rubbers has been taken from the Bureau of Standards circular by Lawrence A. Wood (1940).

NEW PUBLICATIONS

Publications of the United States Department of Commerce, Bureau of Foreign and Domestic Commerce. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. **"Report on Netherlands Indies Rubber Industry."** 53 pages. Price, 20¢. **"Report on Indochina Rubber Industry and Siamese Rubber Production Outlook."** 29 pages. Price, 15¢. **"Report on Malayan and British Borneo Rubber Industry."** 60 pages. Price, 25¢. Conditions in the rubber producing countries in the Far East are summarized in these reports, prepared by Everett G. Holt, Rubber Advisor of the Department, who visited these areas last summer. The rate of rubber production during 1946 is given, and prospective production for 1947 is discussed. Other phases of the rubber producing industry covered include general economy of the countries, political background, currency considerations, estate and native acreage, remilling, equipment, labor, supplies, transportation, production under the Japanese, reoccupation steps, progress in recovery, and rubber stocks.

"Fiber Bonded Processes." Dan River Mills, Inc., Danville, Va. 32 pages. This illustrated booklet describes the Fiber Bonded process, consisting of treating yarns, threads, etc., with plastic and other bonding agents, placing them under tension, and curing or drying them while still under tension. Physical principles of the process are discussed; micro-photographs are given to show effect on yarn; the Fiber Bonded machines are reviewed, and there is a discussion of advantages and applications. Concluding the booklet are copies of the process patents and the company's licensing agreement.

"Parlon, Hercules Chlorinated Rubber-Properties and Uses." Hercules Powder Co., Wilmington, Del. 32 pages. The first section of this booklet discusses properties of Parlon, including chemistry, types, packaging, viscosity, solvents, storage, suitable resins, and plasticizers, etc. Uses of Parlon are described in the second section, including applications in paints and other coatings, inks, adhesives, and textile finishes.

"Continex HMF." Technical Service Report R-3, December 30, 1946. Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. 7 pages. The first series of tests described herein compares Continex HMF, three other HMF-type blacks, Continex SRF, one FF-type black, and Continental AA (EPC) black. Test data and graphs are given to show relative value of these blacks at different loadings and cures in a standard GR-S stock. The second series of tests gives data on the effect of varying loadings and cures in GR-S of Continex HMF as compared with another gas-type HMF black. In both series, test results are given for stocks generally both before and after aging on tensile strength and ratio, modulus at 200% and 300%, elongation, Shore hardness, crescent tear, rebound, cut growth, abrasion loss, permanent set, Royle extrusion, and Williams plasticity.

"The Lagoon of Decision," Walter J. Murphy. Christmas, 1946. 36 pages. This is the author's personal diary from June 8 to July 20, 1946, and covers his trip to observe the first of the Bikini atomic bomb tests. Although non-technical and including some humorous illustrations, the account continually stresses the importance of the bomb tests and the need of complete understanding of the effect of the bomb on our civilization. The author, editor of *Industrial and Engineering Chemistry*, also includes Executive Editor James M. Crowe's description of the second Bikini bomb test, the underwater detonation.

"Stan-Tone Colors." Harwick Standard Chemical Co., Akron, O. 2 pages. The Stan-Tone masterbatched colors for use in rubbers and plastics are described herein, with their methods of use, results obtained, and a list of the available color range given together with a brief note as to composition.

"The Chester Chain Hoist—Its Care and Use." Chester Hoist Co., Lisbon, O. 16 pages. This bulletin describes in detail the company's complete lines of spur geared, differential, and trolley chain hoists. Design and operating principles are given together with complete pricing and specification data.

"Our Third Report to Industry on Simplex Synthetic Rubber Insulations." Simplex Wire and Cable Co., Cambridge Mass. 12 pages. This booklet is issued in reply to the question of whether natural rubber will now replace synthetic in wire insulation. The company is going ahead with synthetic rubber, and the booklet presents discussions and test results on the advantages of synthetic over natural rubber insulations. Tables of typical values for performance grade insulation, heat-resistant insulation, and ozone-resistant insulation, in which GR-S and natural rubber are compared, are included. The table of typical values for insulation for low water absorption compares a special GR-S compound (Buna SA) with natural rubber and deproteinized natural rubber called Anhydrex AA-60 by Simplex. The table for jacket compounds compares neoprene, GR-S, and natural rubber. The Simplex company anticipates a trend toward synthetic rubber in the wire and cable field. Already, with only a brief history, synthetics have proved themselves best for some of our needs and fully equal to natural rubber for others, it is pointed out. As the synthetics are further improved, and as new ones are developed and produced, they will surely replace natural rubber in more and more products, and ultimately the conversion will be complete unless prevented by a prohibitive price differential.

"Why Link-Belt Engineers Created the Electrofluid Drive Packaged Power Unit For You." Book No. 2085. Link-Belt Co., Chicago, Ill. 16 pages. The advantages of the Electrofluid Drive are discussed herein, together with illustrations of the drive, its design principles and operating data. Some typical applications are shown, and there is a list of equipment on which the drive can be applied, including rubber mixers, calenders, mills, sheeters, strainers, tubers, and tire building machines.

"Matthias W. Baldwin (1795-1866), Locomotive Pioneer!" By Ralph Kelly. 32 pages. This is a reprint of an address given by the author, who is president of The Baldwin Locomotive Works, Philadelphia, Pa., before a recent meeting of the Newcomen Society of England. This illustrated story gives an account of the work of Matthias Baldwin in pioneering the development of steam locomotives.

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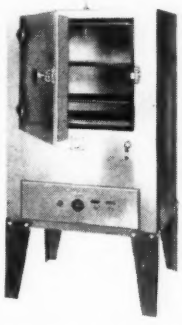

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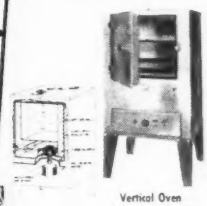

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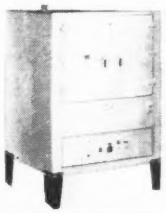

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"The Vanderbilt News." Vol. 13, No. 1, January-February, 1947. R. T. Vanderbilt Co., Inc., 230 Park Avenue, New York, N. Y. 28 pages. This issue marks the reappearance of the well-known company organ after a lapse of almost five years. The first section is devoted to eight materials developed and marketed by Vanderbilt since 1942, giving their properties, methods of use, typical formulations, and test data on results obtained. The second section illustrates and describes new equipment received in the company's laboratories since the last issue of the *News*. The third and final section of this issue concerns identification of rubber chemicals and gives a table for spot test identification together with description of test procedures.

"Hazard Aluminum Building Wire." Hazard Insulated Wire Works Division of the Okonite Co., Wilkes-Barre, Pa. 6 pages. In addition to tables of capacities, comparative weight, and data on characteristics of both copper and aluminum building wire, this bulletin includes an insert giving quick methods of determining voltage drop, conductor sizes, circuit length, and currents. It is also pointed out that suitable connectors, terminal lugs, and other fittings have been developed for use with aluminum conductors.

"Short Story of Rayon." Bulletin No. 2008. American Viscose Corp., New York, N. Y. 30 pages. This illustrated booklet reviews the origin and growth of rayon, the development of the various rayon fibers and processes, the use of rayon in tire cord and other industrial applications, and the role of rayon during the war. There is also a section on the company's personnel and research program.

"Corrosion Resisting Process Equipment." General Catalog H. Duriron Co., Inc., Dayton, O. 20 pages. This bulletin gives a general description of each type of corrosion-resisting equipment made by the company, including pumps, valves, pipes and fittings, kettles, tanks, fans, digestion equipment, and others. The composition and applications of the company's various alloys are explained, and included is a list of processes in different industries in which this equipment handles corrosive chemicals.

"Government Owned Pipe Lines." Report of the War Assets Administration to the Congress, December 18, 1946. 28 pages. **"List of Inspected Gas, Oil, and Miscellaneous Appliances."** November, 1946. 171 pages. **"Bi-Monthly Supplement to All Lists of Inspected Appliances, Equipment, Materials,"** October 1946. 61 pages. December 1946. 53 pages. Underwriter's Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. **"New-Matic Remote Transmission."** Catalog No. 5902. Brown Instrument Co., Philadelphia, Pa. 24 pages. **"Production Decalog."** George Fry & Associates, Inc., 135 S. La Salle St., Chicago, Ill. 40 pages.

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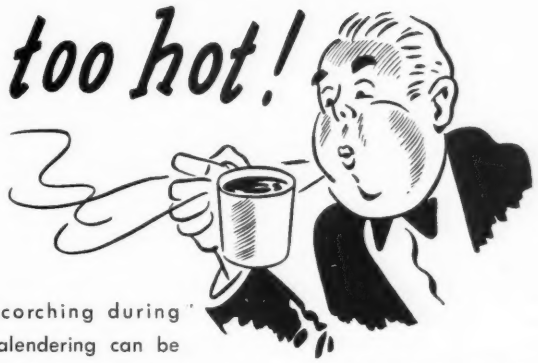

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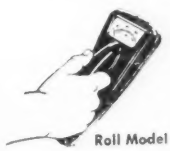
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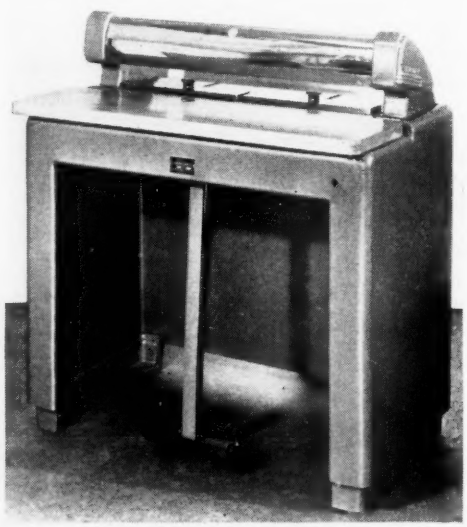
Sheet Plastic Creaser

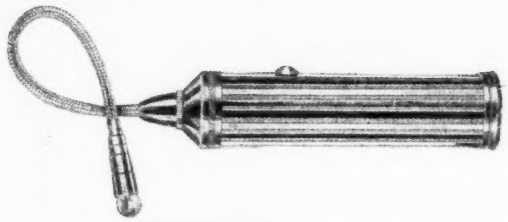
(*Continued from page 714*)

comes in direct contact with the sheeting, pressing it into a metal forming die or a resilient rubber pad. By allowing either metal or rubber type creasing with equal facility, the machine eliminates the problem of under- or over-creasing frequently encountered by use of the rubber pad method alone.

The "Thermocreaser" is functionally designed to expedite maintenance. The fully enclosed mechanism is so designed and prelubricated that it requires no attention on the user's part for lubrication. The machine operates on either 115- or 230-volt lines, AC or DC. Peak efficiency and best creases are obtained at a temperature of 240° F. Operating controls include a thermostat to regulate creasing blade temperature, two indicator lights for current and thermostatic control, respectively, a thermometer for registering blade temperature, and adjusatble back gages for correct feeding and creasing of blanked stock.



"Thermocreaser" for Folding Plastic Sheeting



Standard-Size "Flex-Spot" Flash-Lite

Industrial Flashlights on Flexible Tubing

THE new "Flex-Spot" Flash-Lites, made by Holub Industries, Inc., Sycamore, Ill., incorporate a major design change over conventional types. These flashlights are equipped with a flexible metallic tubing which can be bent at any angle and held in the adjusted position. The tubing can be wound around rods, pipes, etc., or laid down to free both hands. The Flash-Lite gives a powerful and shadowless light spotted exactly where needed. The flexible tube permits entrance into very close or tiny quarters, gives light around corners, illuminates the bottom side of panels or other objects, and reaches into hard to get at places.

These pocket or kit trouble lights will be found indispensable to all repair men, inspectors, mechanics, utility men, electricians, plumbers, etc., in all industries. The lights are made in three styles. The Junior and Junior Deluxe models use two AA penlite-type batteries and are intended for general use; while the Standard model uses two regular-size flashlight cells for longer battery life and is intended for heavy-duty service.

"Heat Embrittlement"

(*Continued from page 665*)

where E_X = elongation at break of normal stock, and E_{OC} = elongation at break of overcured stock, would yield indices showing the effects of cure on heat embrittlement.

Although no study has been made as yet of the properties of F_H' and F_H'', it is possible, of course, that they would be of more interest than F_H. Further work along this line is required to clarify this point.

The authors wish to express their thanks to The Firestone Tire & Rubber Co. for permission to publish this work.

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Market Reviews

COTTON & FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	Nov. 30	Dec. 28	Jan. 4	Jan. 11	Jan. 18	Jan. 25
Apr.	30.37	32.52	32.77	31.28	30.03	30.07
July	28.42	30.75	31.00	29.18	28.08	28.12
Sept.	26.63	28.62	29.01	27.48	26.41	26.72
Nov.	25.43	27.38	27.80	26.36	25.25	25.72
1948 Jan.	24.88	26.98	27.24	25.85	24.68	25.17

COTTON spot and future prices fluctuated irregularly during January in a nervous market. Opening at 33.92¢ on January 2, the 15/16-inch middling spot price rose to the monthly high of 34.28¢ on January 4, underwent a series of slumps and recoveries as it worked downward, slid to the monthly low of 30.85¢ on January 20, and closed at 32.56¢ on January 31. The April futures market closely paralleled the spot market. April futures opened at 32.43¢ on January 2, reached the peak of 32.77¢ on January 4, dropped to 29.55¢ on January 20, and closed the month at 31.37¢.

Factors contributing to the downward movement of prices were as follows: (1) the general pessimistic outlook for after the second quarter as finished goods begin to feel buyer resistance; (2) assertions by Federal Reserve Bank officials that the inflationary movement has passed its peak; (3) the uneasiness of the securities market; (4) reports of renewed union demands for wage increases in southern textile mills; (5) fear of prospecitve restrictive regulations on market speculation by the Commodity Exchange Authority; and (6) mill tendencies to avoid fixing prices except to replace cotton committed on forward sales of textiles.

Partly balancing the pessimistic factors were the following: (1) the suggestion by Secretary of Agriculture Clinton P. Anderson that consideration should be given to revising the parity price formula so as to include farm labor costs; (2) a belief that only a slight recession will be felt this year; (3) the firm statistical position of cotton, with pronounced tightness in supplies expected as early as May; (4) the growing belief that cotton acreage this year will fall below the goal of 23,100,000 acres; and (5) the belief that the market is oversold and that the price reductions represent a normal readjustment from the sharp recovery which followed the October crash.

Unless domestic distribution of all cottons during the remainder of the current season should fall well below present expectations, the carryover of the staple next July 31 will be the smallest end-season stock since 1929. On the basis of an initial total prospective supply of all cottons in this country of 16,250,000 bales, and a full-season distribution outlook of about 13,100,00, a domestic carryover of about 3,150,000 bales appears to be in prospect.

The Bureau of the Census reported that 8,165,988 bales of cotton, excluding linters, were ginned from the 1946 crop prior to January 16, 1947. This figure compares with 8,027,449 bales ginned to the same date a year ago and with 11,114,107 bales two years ago.

Fabrics

With mill activity at the highest point since 1942, and prices at satisfactory levels, indications are that the industry can look forward to a very prosperous year. Production is expected to top the 9,200,000,000-linear-yard output of 1946 by about 8%. Mills are already sold up for the first quarter, and some business has been done through June. Selling beyond June, however, was very limited, and prices for the most part were confined to pre-decontrol levels. Exceptions to the general adherence to former ceiling prices have been noted in the case of second-hand goods moved for quick delivery, print cloths, and narrow sheetings. Toward the end of January there was a definite slowing up in second-hand sales because of the high prices and the gradual drying up of the choice items.

The market for industrial gray cloths in the rubber trade was described as healthy, with demand for tire fabrics greater than the supply, and dealers finding it impossible to build up inventories. This condition is expected to remain unchanged for at least the first and second quarters, after which the supply is expected to be more adequate. Canvas rubber footwear is being produced in increasingly large quantities, but it will be some months before stocks can be brought up to normal levels. Demand for rubber clothing and coated fabrics is expected to exceed the supply for many months. Manufacturers of rainwear and rubberized cloth are in great need of standard sheeting constructions and are seeking goods for both quick and future deliveries.

RAYON

WHILE statistics on December rayon production and shipments are not yet available, preliminary reports indicate that figures were below November levels as a result of the coal strike and continued shortages of basic rayon raw materials. Despite the adverse effects of strikes, raw material shortages, and other operating difficulties during the year, rayon production in 1946 was the largest on record in all branches of the industry.

The major task confronting the viscose rayon industry today is the expansion of its production facilities. Existing plants must be enlarged and new plants built if the needs of current and potenial markets for rayon are to be satisfied to any reasonable degree. A recent survey of the industry through 1948 discloses an expected over-all poundage increase of 26% in plant capacity. The industry's capacity by the fourth quarter of 1948 is expected to total 1,120,000,000 pounds, as against a present operating capacity of 891,000,00 pounds annually. The one-billion-pound-capacity level will be passed by the end of 1947, according to this survey. The production capacity for high-tenacity viscose yarn is expected to total 250,000,000 pounds per year by late 1948, or 5% larger than the present figure.

Production of tire yarn in 1947 is expected to meet only two-thirds of the requirements. Capacity operation throughout the year at all plants in the country will yield an estimated 240,000,000 pounds. Actual needs have been placed at about 340,000,000 pounds. Third-quarter 1946 production of rayon tire fabric and cord was about 52,000,000 pounds and was below that of the first and second quarters.

SCRAP RUBBER

THE scrap rubber market has shown no appreciable change since decontrol. Despite price advances in other scrap and waste commodities, reclaimers have firmly resisted any attempt at higher price levels for scrap rubber. As a result, the market has been dull and relieved only by occasional spotty sales to regular customers. Larger dealers who sell to reclaimers report that their smaller suppliers are not interested in moving scrap tires, peelings, or tubes at existing prices since it has become unprofitable to do so. Especially is this true in the South where freight rates, which were advanced on January 1, now run from $13 to $16 a ton. With all their added expenses these small dealers cannot make ends meet, and they are moving into other waste material fields rather than work at a very narrow margin of profit in scrap rubber.

Quoted prices are unchanged, but the market is decidedly unsteady because of the price angle and the lethargic demand on the part of reclaimers.

Following are dealers' buying prices for scrap rubber, in carload lots, delivered points indicated:

	Eastern Points	Akron, O.
	(Net per Ton)	
Mixed auto tires	$17.50	$19.50
Truck and bus tires	17.50	19.50
Beadless tires	23.00	24.50
S.A.G. passenger (natural)	17.50	18.00
Passenger (synthetic)	nom.	nom.
Truck (natural)	15.50	16.00
Truck (synthetic)	nom.	nom.
No. 1 peelings (natural)	45.00	46.00
Peelings (synthetic)	nom.	nom.
Peelings (recap.)	nom.	nom.
No. 2 peelings (natural)	31.00	31.50
Peelings (synthetic)	nom.	nom.
Peelings (recap.)	nom.	nom.
No. 3 peelings (natural)	28.00	29.00
Peelings (synthetic)	nom.	nom.
	(¢ per Lb.)	
Mixed auto tubes	6.0	5.5
Red pasenger tubes	7.25	7.25
Black passenger tubes	6.25	6.25
Black truck tubes	6.0	6.0
Mixed puncture-proof tubes	2.0	2.0
Air brake hose	nom.	nom.
Rubber boots and shoes	nom.	nom.

RECLAIMED RUBBER

RECLAIMED rubber market conditions remained unchanged during January. Production and consumption continued at high levels, and the favorable buyers' market for scrap rubber carried over from previous months. Probably the only noteworthy change was the continued rise in production of synthetic rubber reclaims. It was estimated that synthetic reclaims comprised about 15% of total production on the average, with some reclaimers producing as much as 25% synthetic reclaims, either wholly or in mixtures with natural rubber reclaims.

Final October and preliminary November figures on reclaim are now available. Production of reclaim in October

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was 26,322 long tons; consumption, 26,706 long tons; exports, 759 long tons; and end-of-month stocks, 34,261 long tons. Both production and consumption in October were at record levels for 1946, but showed a slight decline in November. Preliminary figures for November are: production, 24,802 long tons; consumption, 24,648 long tons; exports, 1,108 long tons; and end-of-month stocks, 33,307 long tons.

Reclaimed Rubber Prices

	Sp. Grav.	¢ per Lb.
Auto Tire		
Black Select	1.16-1.18	7½ / 7¾
Acid	1.18-1.22	8½ / 8¾
Shoe		
Standard	1.56-1.60	8 / 8¼
Tubes		
Black	1.19-1.28	12¼ / 12½
Gray	1.15-1.26	13 / 14
Red	1.15-1.32	13 / 13½
Miscellaneous		
Mechanical blends	1.25-1.50	5½ / 6½

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Compounding Ingredients—Price Changes and Additions

Accelerators, Inorganic		
Lime, hydrated *ton*	$8.00	/ $12.00
Litharge, commercial *lb.*	.1425	/ .1625
Red lead, commercial *lb.*	.155	/ .1725
White lead, basic *lb.*	.1425	/ .1475
Activators, Organic		
Delac P *lb.*	.45	/ .52
Guantal *lb.*	.43	/ .50
Antiseptics		
Copper naphthenate, 6-8% *lb.*	.205	
Resorcinol, technical *lb.*	.68	
Zinc naphthenate, 8-10% *lb.*	.1875	/ .225
Blowing Agents		
Sodium carbonate, technical *100 lbs.*	1.00	/ 4.13
Carbon Blacks		
Easy Processing Channel—EPC		
Spheron # 9 *lb.*	.06	/ .102
Hard Processing Channel—HPC		
Spheron #4 *lb.*	.06	/ .102
Medium Processing Channel—MPC		
Spheron #6 *lb.*	.06	/ .102
Fine Furnace—FF		
Sterling 99 *lb.*	.10	
High Elongation Furnace—HEF		
Sterling K *lb.*	.05	/ .09
High Modulus Furnace—HMF		
Sterling L *lb.*	.05	/ .09
Semi-Reinforcing Furnace—SRF		
Sterling R, S *lb.*	.036	/ .075
Fine Thermal—FT		
P-33 *lb.*	.0475	/ .075
Medium Thermal—MT		
Thermax *lb.*	.0275	/ .0575
Colors		
Red		
Cadmium Red Lithopone *lb.*	1.00	/ 1.53
White		
Lithopone, titanted Cryptone BT *lb.*	.0725	/ .075
Titanium pigments		
Rayox LW *lb.*	.155	/ .16⅜
R-110 *lb.*	.175	/ .18⅝
Zinc oxides		
Azo ZZZ-11-44,-55 *lb.*	.095	/ .0975
-66 *lb.*	.1175	/ .12
35% leaded *lb.*	.11	/ .1125
Eagle AAA, lead free *lb.*	.095	/ .09⅞
35% leaded *lb.*	.11	/ .11⅜
50% leaded *lb.*	.11⅜	/ .12
Florence Green Seal -8 *lb.*	$0.1125	/ $0.115
Red Seal-9 *lb.*	.1075	/ .11
White Seal-7 *lb.*	.1175	/ .12
Horsehead XX-4, -78, -166 *lb.*	.095	/ .0975
Kadox-15, -17, 72 *lb.*	.095	/ .0975
-25 *lb.*	.1175	/ .12
Zinc sulfide Cryptone ZS *lb*	.10	/ .1025
Yellow		
Cadmolith *lb.*	.75	/ .85
Dispersing Agents		
Darvan Nos. 1, 2 *lb.*	.19	/ .30
Dusting Agents		
Mica *lb.*	.0575	/ .0625
Pyrax A *ton*	11.50	
W. A. *ton*	13.00	
Extenders		
Mineral Rubbers		
Hard hydrocarbon *ton*	32.00	/ 34.00
Fillers, Inert		
Clays		
McNamee *ton*	12.50	
Lead sulfate, basic *lb.*	.1375	/ .14
Lithopone, commercial *lb.*	.05	/ .0575
Albalith *lb.*	.055	/ .0575
Mica *lb.*	.0575	/ .0625
Pyrax A *ton*	11.50	
W. A. *ton*	13.00	
Finishes		
Black-Out *gal.*	4.50	/ 8.00
Wax, Bees *lb.*	.57	/ .70
Carnauba *lb.*	1.50	/ 1.90
Latex Compounding Ingredients		
Agchem RC-30 Series *gal.*	.1425	/ .34
RC-109 Series *gal.*	.235	/ .35
SA-9 *gal.*	.72	/ .74
-11, -21 *gal.*	1.10	/ 1.12
-12 *gal.*	1.01	/ 1.03
-16 *gal.*	.29	/ .31
AgeRite Dispersions *lb.*	.50	/ 2.25
Areskap 50 *lb.*	.30	/ .38
100, dry *lb.*	.60	/ .72
Aresket 240 *lb.*	.30	/ .38
300, dry *lb.*	.60	/ .72
Aresklene 375 *lb.*	.42	/ .57
400, dry *lb.*	.70	/ .84
Dispersed sulfur No. 2 *lb.*	.10	/ .12
Santomerse D *lb.*	.43	/ .65
S *lb.*	.13	/ .25
Zinc oxide, dispersed *lb.*	.25	
Mold Lubricants		
Aluminum stearate, precip. *lb.*	.45	/ .52
Mica *lb.*	.0575	/ .0625
Plasticizers and Softeners		
Dibutyl sebacate *lb.*	.547	/ .562
Tricresyl phosphate *lb.*	.32	/ .375
Tysonite *lb.*	.215	/ .2225
Reclaiming Oils		
BWH-1 *lb.*	.11	
Reinforcers, Other Than Carbon Black		
Clays		
Cnina *ton*	9.50	/ 16.00
Dixie *ton*	13.00	
Magnesia, Calcined Light, technical *lb.*	.28	
Extra-light, U. S. P. *lb.*	.31	
Magnesium carbonate *lb.*	.065	/ .1075
Marbon Type B *lb.*	.65	/ .75
Retarders		
Delac J *lb.*	.55	/ .60
Solvents		
Carbon bisulfide *lb.*	.06	/ .085
Synthetic Rubbers		
Chemigum Latex Type 101 (solids weight) *lb.*	.37	/ .40
Hycar Latex (dry weight)		
OR-15 *lb.*	.455	/ .53
OR-25 *lb.*	.385	/ .46
Hycar OR-15 *lb.*	.47	/ .505
OR-25, OS-10 *lb.*	.40	/ .435
Perbunan 18 *lb.*	.39	/ .425
26 *lb.*	.40	/ .435
35 *lb.*	.47	/ .505
Vulcanizing Agents		
Litharge, commercial *lb.*	$0.1425	/ $0.1625
Magnesia, Calcined Light, technical *lb.*	.28	
Extra-light, U. S. P. *lb.*	.31	
Red lead, commercial *lb.*	.155	/ .1725

Rims Approved and Branded by The Tire & Rim Association, Inc.

Rim Size	Dec., 1946
15" & 16" D. C. Passenger	
16x4.00E	546,785
16x4.50E	315,002
15x5.00E	146,528
16x5.00F	27,595
15x5.50F	82,555
15x5.50F	2,301
16x6.00F	11,536
16x4.00E—Hump	180,182
16x4.25E—Hump	4,219
15x4.50E—Hump	60,817
16x4.50E—Hump	13,069
15x5.50F—Hump	1,183
15x5-K	16,712
16x5-K	127,303
15x6-L	13,579
16x6-L	82,718
15x6-½-L	38,957
16x6-½-L	5,034
17" & Over Passenger	
18x6-L	1,991
Flat Base Truck	
17x4.33R	13,333
20x4.33R	37,420
17x5.00R	2,539
20x5.00R	27,403
15x5.00S	917
17x5.0	14,784
20x5.0	44,811
20x5.00S	228,505
24x5.00S	1,692
20x6.0	143,724
20x6.00S	2,502
15x6.00T	720
20x6.00T	28,633
24x6.00T	1,249
18x7.0	999
20x7.0	3,883
18x7.00T	107
20x7.00T	11,155
22x7.00T	2,506
15x7.33V	642
18x7.33V	1,278
20x7.33V	39,644
22x7.33V	4,738
24x7.33V	1,555
19x8.0	36
20x8.0	1,315
19x8.37V	585
20x8.37V	1,181
24x8.37V	1,427
Semi D. C. Truck	
15x5.50F	8,884
16x5.50F	25,146
16x6.00G	5,555
Tractor & Implement	
12x2.50C	5,023
12x3.00D	27,226
15x3.00D	4,855
18x3.00D	4,113
19x3.00D	22,743
21x3.00D	1,210
18x3.25E	2,698
21x3.25E	1,355
20x4.50E	88
18x5.50F	13,937
20x5.50F	5,673
24x5.50R	3,099
20x6.00S	984
24x6.00S	6,125
36x6.00S	2,505
20x8.00T	3,109
24x8.00T	11,570
30x8.00T	319
32x8.00T	1,232
40x8.00T	755
W6-24	621
W7-24	896
W8-24	9,026
W8-38	130
W9-24	3,462
W9-28	2,578
W10-36	2,844
W10-38	9,963
W11-26	975
DW8-42	240
DW9-38	4,667
DW10-38	10,022
DW11-28	860
DW11-38	2,864
DW12-34	1,698
Earth Mover	
20x11.25	82
24x15.00	252
Total	2,503,133

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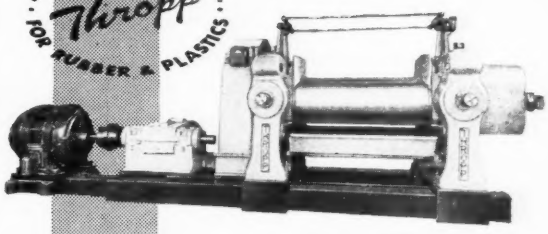

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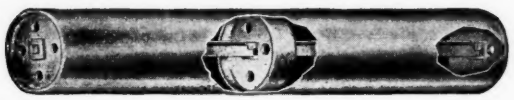

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Dominion of Canada Statistics

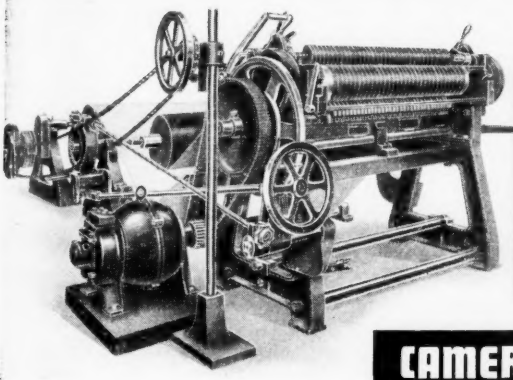
Imports of Crude and Manufactured Rubber

	November, 1946		November, 1945	
	Quantity	Value	Quantity	Value
UNMANUFACTURED				
Balata ..... lbs.	700	$ 2,533	.....	$ .....
Crude rubber ..... lbs.	17,523	4,875	566,350	82,286
Latex ..... lbs.	367,565	67,641	3,982	1,895
Rubber, powdered and waste ..... lbs.	1,555,900	3,195,300	605,100	1,750,500
Recovered ..... lbs.	1,752,800	14,045,600	1,729,600	12,775,900
Synthetic and substitute ..... lbs.	213,200	5,202,700	327,800	9,066,000
TOTALS	3,907,688	$22,518,669	8,698,832	$23,676,581
PARTLY MANUFACTURED				
Hard rubber in rods or tubes ..... lbs.	1,010	$ 930	96	$ 170
Rubber thread, not covered ..... lbs.	5,794	9,195	2,469	2,740
TOTALS	6,804	$ 10,125	2,565	$ 2,910
MANUFACTURED				
Belting	.....	$ 56,218	.....	$ 39,747
Boots and shoes of rubber, n.o.p. ..... prs.	21,179	13,108	12,554	9,111
Canvas shoes with rubber soles ..... prs.	258	785	.....	.....
Cement	.....	38,100	.....	19,593
Clothing of water proofed cotton or rubber	.....	8,015	.....	680
Druggists' sundries	.....	51,321	.....	22,495
Gaskets and washers	.....	18,711	.....	12,223
Gloves ..... doz. prs.	2,164	9,120	2,179	5,943
Golf Balls ..... doz.	658	3,533	2	24
Heels ..... prs.	8,230	1,347	200	20
Hose	.....	42,162	.....	29,842
Hot water bottles	.....	4,061	.....	205
Inner tubes, n.o.p. ... no.	7,662	45,559	103	218
Bicycle ..... no.	1,456	965	704	364
Liquid sealing compound.	.....	10,608	.....	10,395
Mats and matting	.....	60,399	.....	8,993
Nursing nipples .... gross	1,394	4,061	283	860
Packing	.....	9,078	.....	8,807
Raincoats ..... no.	2,354	7,451	.....	.....
Tire repair material	.....	43,981	.....	7,360
Tires, pneumatic, n.o.p. ..... no.	17,308	670,764	113	7,853
Bicycle ..... no.	5,748	5,501	720	786
Solid, for automobile and motor trucks. no.	29	545	22	859
Other ..... no.	.....	6,666	.....	1,656
Other rubber manufacturers	.....	326,420	.....	169,624
TOTALS	.....	$ 1,438,479	.....	$ 357,658
TOTAL RUBBER IMPORTS	.....	$23,967,273	.....	$24,037,149

Exports of Crude and Manufactured Rubber

UNMANUFACTURED				
Crude rubber, including synthetic rubber ... lbs.	6,948,435	$1,282,298	1,622,916	$ 420,532
Waste rubber ..... lbs.	1,280,000	1,610,300	2,209,500	3,306,100
TOTALS.	8,228,435	$2,892,598	3,832,416	$3,726,632
PARTLY MANUFACTURED				
Soling slabs of rubber lbs.	3,937	1,099	7,150	1,496
MANUFACTURED				
Bathing caps	.....	44	.....	.....
Belting, n.o.p. ..... lbs.	217,369	129,998	149,051	90,995
Belts, Fan	.....	3,606	.....	.....
Boots and shoes of rubber, n.o.p. ..... prs.	114,299	223,392	217,073	373,356
Canvas shoes with rubber soles ..... prs.	159,448	155,607	269,887	286,704
Clothing of rubber and waterproofed clothing..	.....	23,534	.....	4,064
Heels ..... prs.	379,851	19,584	122,820	12,348
Hose	.....	59,920	.....	63,442
Inner tubes for motor vehicles ..... no.	25,260	64,605	9,193	33,034
Soles ..... prs.	26,646	3,956	2,120	558
Tires, pneumatic, for motor vehicles ..... no.	25,091	380,938	8,623	171,442
Other ..... no.	314	997	1,528	1,971
Wire and cable, copper, insulated	.....	54,732	.....	299,878
Other rubber manufactures	.....	66,455	.....	24,608
TOTALS	.....	$1,187,368	.....	$1,075,696
TOTAL RUBBER EXPORTS	.....	$4,079,966	.....	$4,802,328

WHEN IT NO LONGER became possible to get raw rubber from the Far East, the Government of the Union of South Africa turned to Zululand and other parts of Africa for supplies of raw rubber. At the end of hostilities, stocks of these and other natural rubbers held by the government amounted to 16,000,000 pounds. Of this, 12,000,000 pounds in addition to 10,000,000 pounds of synthetic rubber have already been sold to local manufacturers of tires, shoes and hose, and the government is now offering for sale the remaining 4,000,000 pounds of raw rubber.



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Address Box No. 786
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Large Ohio Research Laboratory has position available for trained colloidal chemist to handle important fundamental work in field of latex. Will consider man with major in biological or physical chemistry if he has some training in colloidal work. In reply state age, experience, training, and salary expected.

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Address Box No. 764,
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SITUATIONS OPEN—(Continued)

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PRODUCTION FOREMAN TO SUPERVISE PRESS LINE AND production of small rubber plant manufacturing molded and extruded rubber products. Excellent opportunity. Plant located in Philadelphia area. State experience, salary, etc. Address Box No. 766, care of INDIA RUBBER WORLD.

WANTED: A THOROUGHLY EXPERIENCED MAN TO ORGANize and operate a very small plant manufacturing rubber heels and soles. He must be thoroughly familiar with all technical details of manufacture and know where to obtain machinery and how to install it. This will be a new department of an old-established company in another line. Please give full details of experience, compensation desired, and other pertinent information. Address Box No. 767, care of INDIA RUBBER WORLD.

NATIONALLY KNOWN NEW YORK CITY MANUFACTURING firm planning to organize a rubber molding division requires services of an experienced manager, having thorough knowledge of rubber chemistry, compounding, and modern production methods. Give particulars regarding background, availability and salary required in first letter. Address Box No. 774, care of INDIA RUBBER WORLD.

HELP WANTED—RUBBER CHEMIST
One to five years' experience for work in Akron, Ohio, sales service rubber laboratory. Excellent opportunity for broad training and advancement with rapidly expanding division of large company. Advise age, experience, date available, and salary required. All replies kept strictly confidential. Address Box No. 778, care of INDIA RUBBER WORLD.

SURGICAL RUBBER GOODS—MAN—FULLY EXPERIENCED IN manufacturing and marketing. Excellent opportunity for right party. Eastern location. Address Box No. 785, care of INDIA RUBBER WORLD.

PLANT SUPERINTENDENT WANTED FOR PLANT WITH about 75 employes. Experience in calendering and embossing, spreading and mixing and general factory supervision. New York area. Send resume of experience to Box IRW 2062, 113 W. 42nd Street, New York 18, N. Y.

WANTED BY PROGRESSIVE MANUFACTURER IN UNLIMITED field a practical experienced man in field of latex dipped and molded rubber specialties. Our man will have a creative mind, technical training, and an ability to translate experimental ideas into pilot and manufacturing operations. Address Box No. 787, care of INDIA RUBBER WORLD.

RUBBER CHEMIST: 10 YEARS OF EXPERIENCE AT LEAST in Tires. Must do research in laboratory and manufacturing. State university graduated and where worked. Excellent opportunity with good salary. Address Box No. 788, care of INDIA RUBBER WORLD.

LATEX CHEMIST

Position requires man with broad experience in handling latex technological processes. Background should be in research rather than development. Work will include dipped goods, sponge, thread, and adhesives. Must be capable of doing independent work in formulations and methods. Midwest location. In reply give us complete history of training and experience.

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Continued

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CHEMIST-ENGINEER: B. S. IN CH.E., 1940, GRADUATE STUDY. Over six years' experience natural rubber technology, GR-S manufacture. Experience: control, development, compounding, production, supervision, pilot-plant. Desire responsible position with progressive organization. Address Box No. 768, care of INDIA RUBBER WORLD.

RUBBER TECHNOLOGIST—GRADUATE CHEMICAL ENGINEER with 5 years' experience in compounding and production control of all phases of insulated wire. Under 40, employed, family. Permanent position desired as rubber technician or control manager in extruded or molded goods. Address Box No. 771, care of INDIA RUBBER WORLD.

FACTORY SUPERINTENDENT WITH 25 YEARS' EXPERIENCE desires connection with small going or newly organized rubber plant, preferably in New York area. Qualified to handle help efficiently, production problems, compounding and development work with all types of synthetics, molded, sheeted and extruded goods, and sponge. Numerous trade contacts. Address Box No. 776, care of INDIA RUBBER WORLD.

TECHNICAL MAN—DESIRES POSITION WITH RUBBER COMpany in the coumpounding or production department. Experienced in rubber compounding, factory processing, and production control. South or Midwest location desired. Address Box No. 777, care of INDIA RUBBER WORLD.

MILL ROOM SUPERINTENDENT WITH PRACTICAL EXperience in compounding, mixing, calendering, tires, sundries, footwear, and vinyl film seeks position with responsible concern. Address Box No. 791, care of INDIA RUBBER WORLD.

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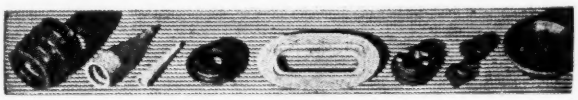

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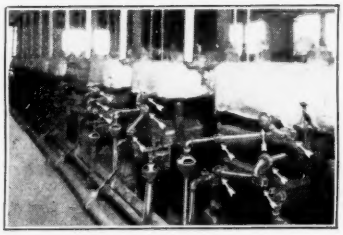

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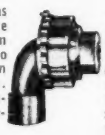

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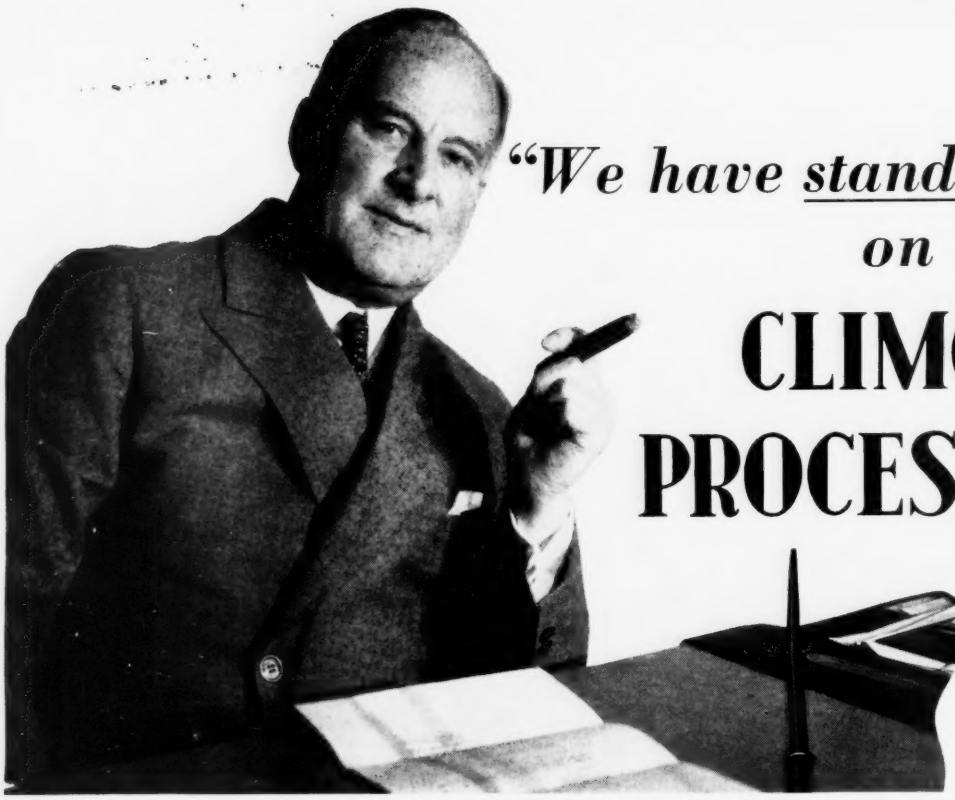

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